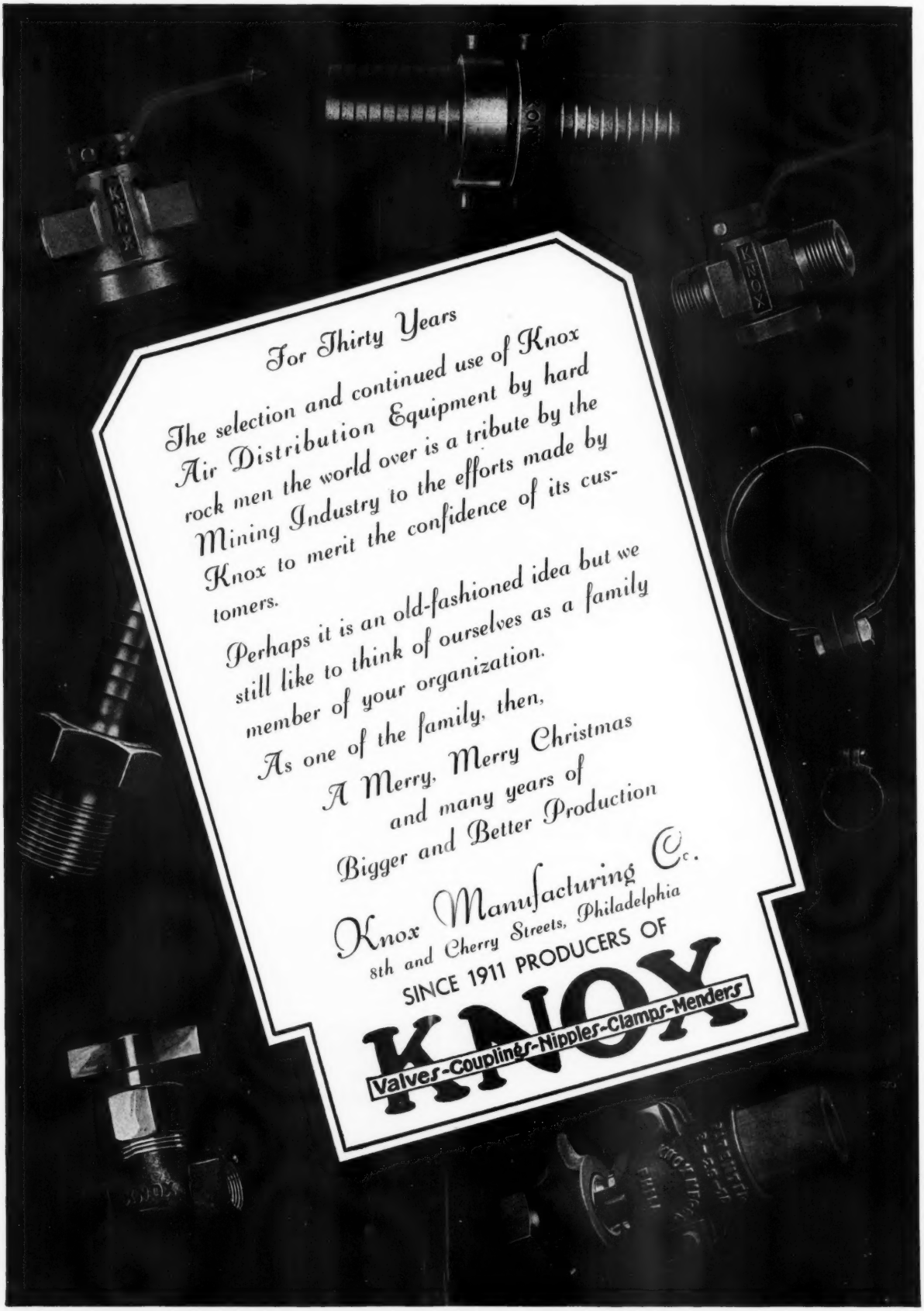
MINING CONGRESS JOURNAL

GREETINGS OF THE SEASON

FROM ALL OF US TO ALL OF YOU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MINING CONGRESS JOURNAL

Vol. 27 DECEMBER, 1941 No. 12

Among other features this month, the Journal presents highlights of the symposium on Taxation which was held at the Metal Mining Convention in San Francisco. These discussions are of tremendous importance to the mining industry, for on an equitable adjustment of these problems lies the fate of many mining properties.

Heavy taxation is inevitable, to support the present functions of government and complete our defense effort. But in the rush of writing tax laws, the Treasury and Congress have permitted inequalities and injustices to creep in; these must be corrected, and special consideration given to special conditions, if the industry is to survive and make the full contribution to the nation's welfare of which it is capable.

Read these discussions thoughtfully; the problems affect YOU.

TABLE OF CONTENTS

Page

EDITORIALS:
Manganese and Chrome Ore Purchases ... 17
The Irreducible Minimum ... 17
MINE ACCIDENT PREVENTION IN THE PRESENT EMERGENCY ... 18
By James K. Richardson
UNDERGROUND MECHANICAL LOADING ... 23
By Joseph A. Wilcox
SHAKER CONVEYOR MINING AT THE CENTURY COAL CO. ... 26
By John L. Orr
FLUID DRIVE FOR MINING MACHINERY ... 30
By John D. Rosebrough
PRACTICAL LIGHTNING PROTECTION AT MINE SUB-STATIONS ... 35
By C. C. Ballard
PERFORMANCE RECORDS FOR WIRE ROPE ... 37
DRAGLINE DREDGE METHODS AND EQUIPMENT ... 38
By Harry S. Lord
ASPECTS OF MINE TAXATION—
Taxes—An Operating Problem ... 42
By Louis S. Cates
The Excess Profits Tax and Mining ... 44
By Ellsworth C. Alvord
Effect of Present Federal Tax Policy on Mine Valuations ... 46
By Herbert C. Jackson
Determination of Gross Income for Percentage Depletion ... 47
By James A. Runser
1942 COAL CONVENTION PROGRAM OUTLINED ... 48
WITH THE COAL DIVISION OF THE AMERICAN MINING CONGRESS
Annual Conference of Division Committees ... 50
Reports of the Committees ... 52
WHEELS OF GOVERNMENT ... 54
PERSONALS ... 57
NEWS AND VIEWS ... 59
MANUFACTURERS' FORUM ... 67

Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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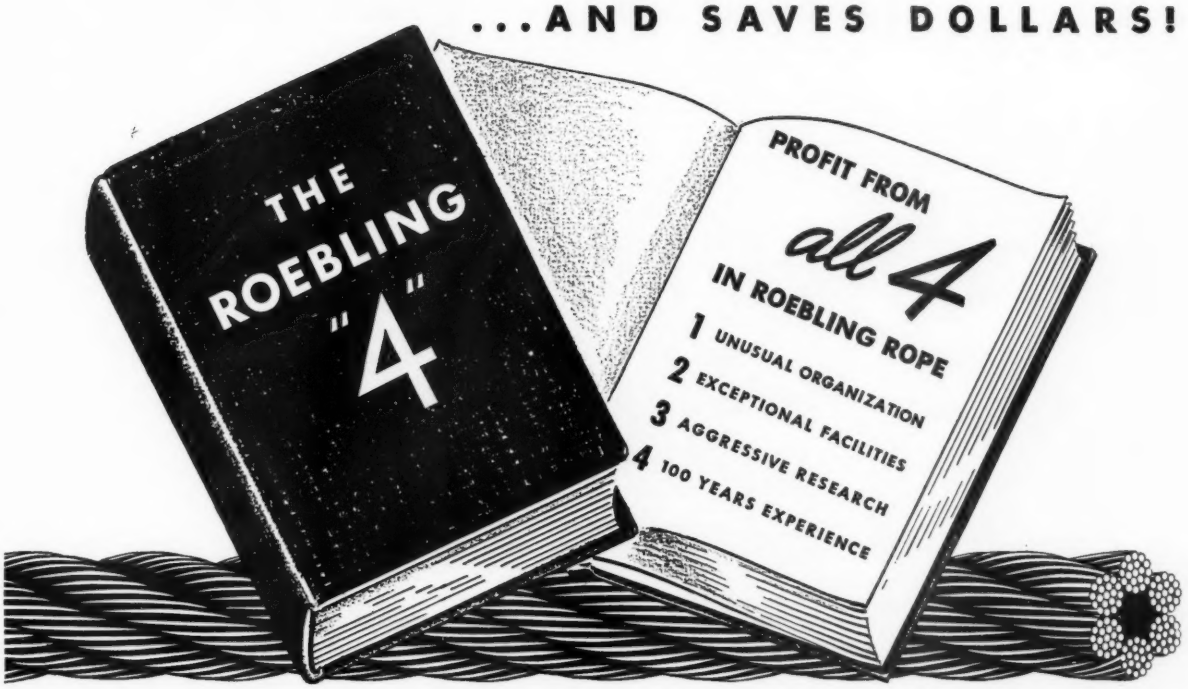

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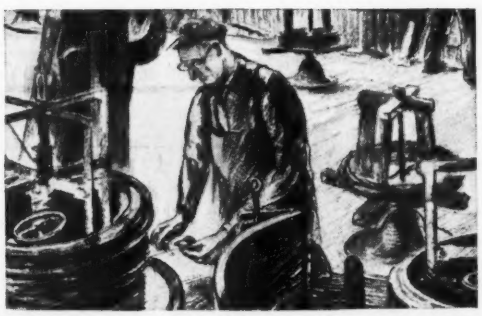

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LOADERS AND SHUTTLE CARS

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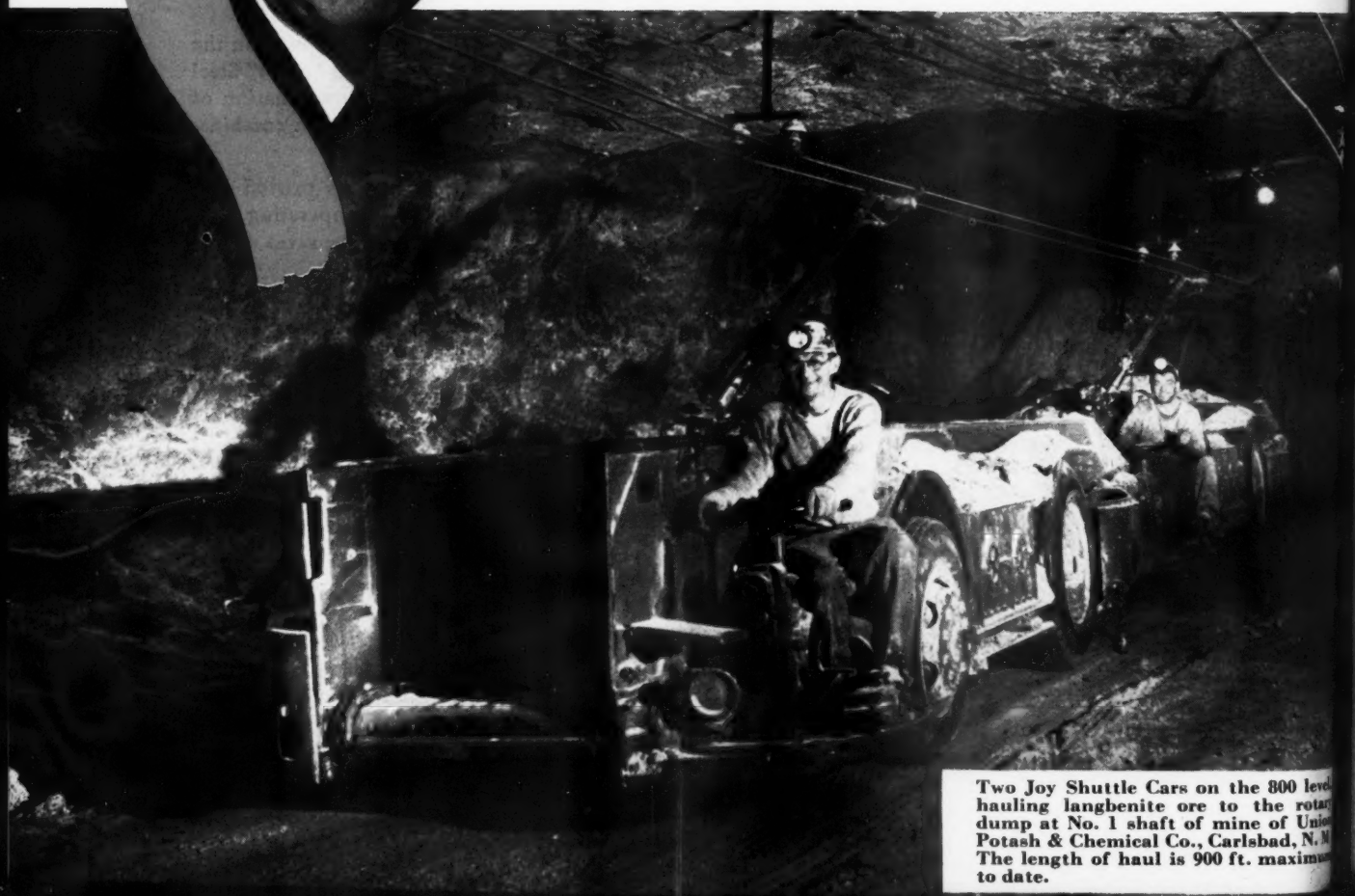

Two Joy Shuttle Cars on the 800 level hauling langbenite ore to the rotary dump at No. 1 shaft of mine of Union Potash & Chemical Co., Carlsbad, N. M. The length of haul is 900 ft. maximum to date.

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Joy 11-BU Loading Machine loading ore in mine of Union Potash & Chemical Co., Carlsbad, N.M.

One of two Joy Shuttle Cars on the 800 level after discharging its load of langbenite ore at Union Potash & Chemical Co. Mine, Carlsbad, N.M.

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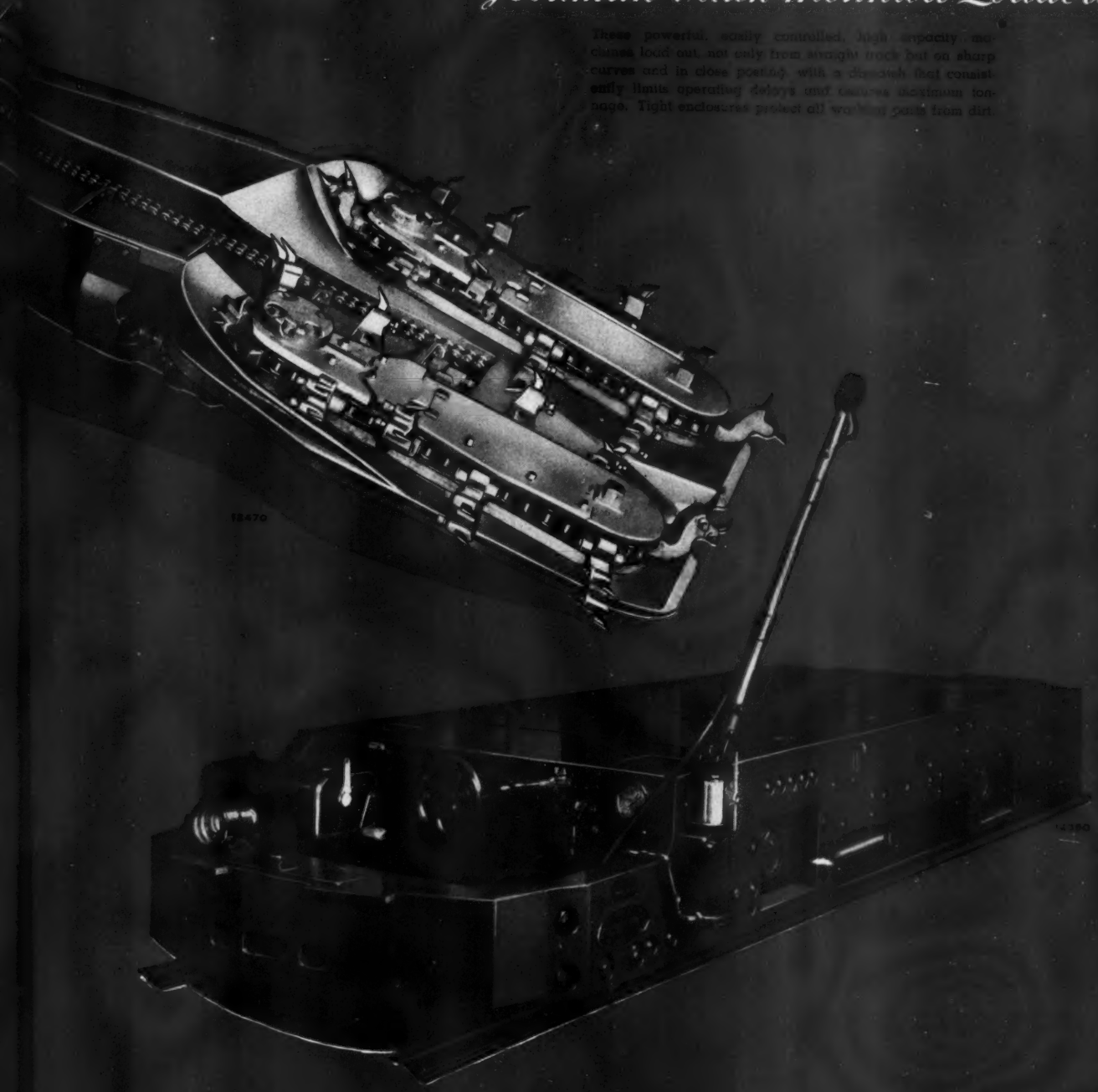

Without obligation, consult a Goodman engineer for details of our complete line of modern, mechanized mine equipment.

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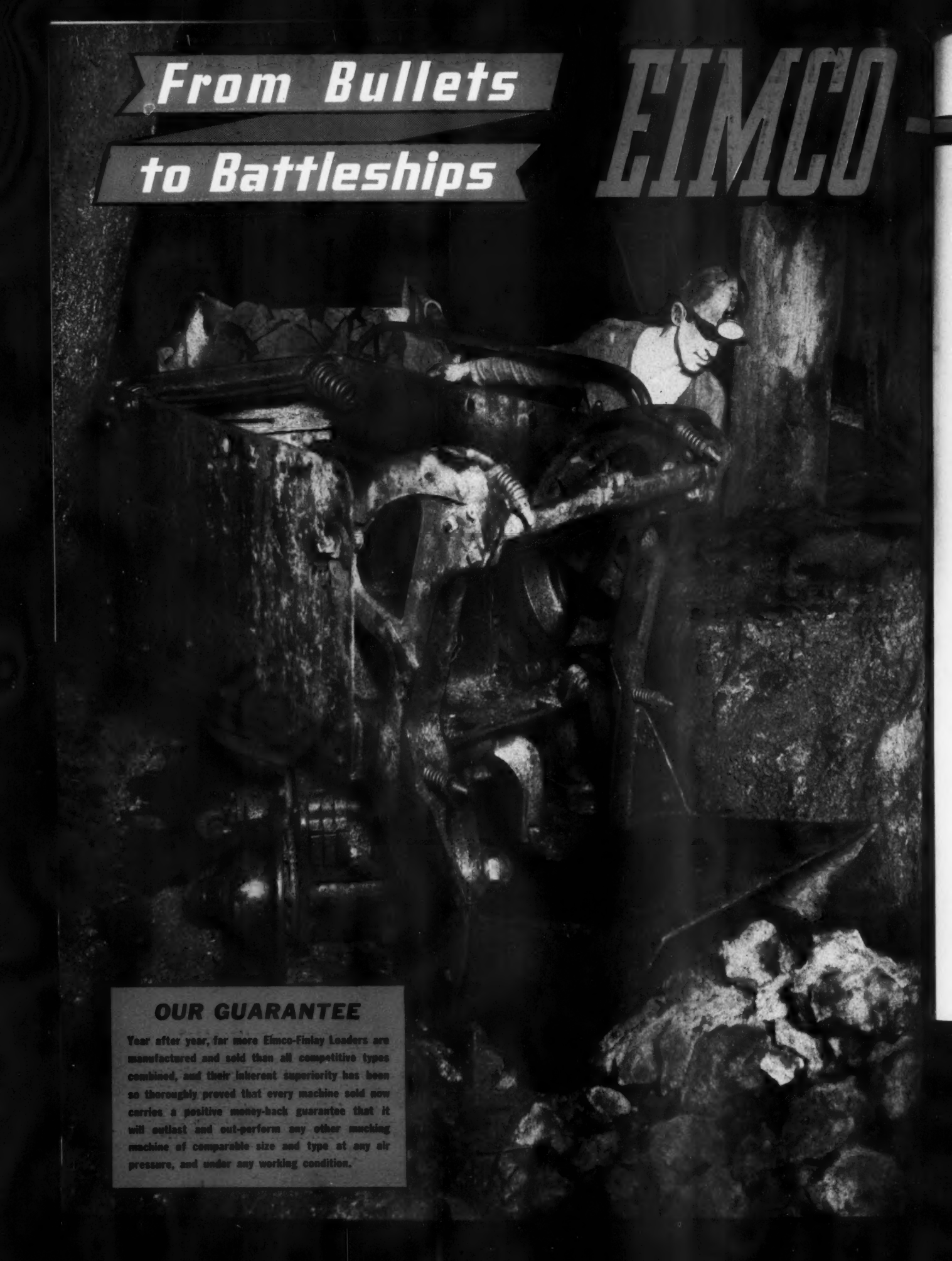
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Year after year, far more Eimco-Finlay Loaders are manufactured and sold than all competitive types combined, and their inherent superiority has been so thoroughly proved that every machine sold now carries a positive money-back guarantee that it will outlast and out-perform any other mucking machine of comparable size and type at any air pressure, and under any working condition.

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Today, as never before, the revolutionary contribution of the Eimco-Finlay Loader to mechanized loading of rock and ore underground is playing a vital part in the defense of democracy throughout the world. From the besieged cities and outposts where tunnels are being driven for safe shelter and storage to the many great mines throughout the British Empire and our own country producing much-needed supplies of iron, copper, lead, zinc, nickel, tungsten, chromium and other essential metals, production is being speeded and development work maintained to meet the ever-increasing demands of all-out defense.

Naturally, we are being called upon from every quarter of the globe to furnish MORE Eimco-Finlay Loaders and are exerting every effort to fill these orders promptly. Recognition by the U. S. Government of our services to the mining industry, enables us to secure materials and to maintain normal delivery schedules — even in these difficult times.

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Defense Savings Pay-Roll Allotment Plan

How company heads can help their country, their employees, and themselves

voluntary pay-roll allotment plan | helps workers provide for the future | helps build future buying power | helps defend America today

This is no charity plea. It is a sound business proposition that vitally concerns the present and future welfare of your company, your employees, and yourself.

During the post-war period of readjustment, you may be faced with the unpleasant necessity of turning employees out into a confused and cheerless world. But you, as an employer, can do something *now* to help shape the destinies of your people. Scores of business heads have adopted the Voluntary Pay-roll Allotment Plan as a simple and easy way for every worker in the land to start a *systematic* and *continuous* Defense Bond savings program.

Many benefits . . . present and future. It is more than a sensible step toward reducing the ranks of the post-war needy. It will help spread financial participation in National Defense among all of America's wage earners.

The widespread use of this plan will materially retard inflation. It will "store" part of our pyramiding national income that would otherwise be spent as fast as it's earned, increasing the demand for our diminishing supply of consumer goods.

And don't overlook the immediate benefit . . . money for defense materials, quickly, continuously, *willingly*.

Let's do it the American way! America's talent for working out emergency problems, democratically, is being tested today. As always, we will work it out, without pressure or coercion . . . in that old American way; each businessman strengthening his *own* house; not waiting for his neighbor to do it. That custom has, throughout history, enabled America to get things done *of its own free will*.

In emergencies, America doesn't do things "hit-or-miss." We would get there *eventually* if we just left it to everybody's whim to buy Defense Bonds when they thought of it. But we're a nation of businessmen who understand that the way to get a thing done is to *systematize* the operation. That is why so many employers are getting back of this Voluntary Savings Plan.

Like most efficient systems, it is amazingly simple. All you have to do is offer your employees the convenience of having a fixed sum allotted, from each pay envelope, to the purchase of Defense Bonds. The employer holds these funds in a separate bank account, and delivers a Bond to the employee each time his allotments accumulate to a sufficient amount.

Each employee who chooses to start this savings plan decides for himself the denomination of the Bonds to be purchased and the amount to be allotted from his wages each pay day.

How big does a company have to be? From three employees on up. Size has nothing to do with it. It works equally well in stores, schools, publishing houses, factories, or banks. This whole idea of pay-roll allotment has been evolved by businessmen in cooperation with the Treasury Department. Each organization adopts its own simple, efficient application of the idea in accordance with the needs of its own set-up

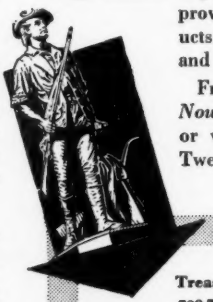
No chore at all. The system is so simple that A. T. & T. uses exactly the same easy card system that is being used by hundreds of companies having fewer than 25 employees! It is simple enough to be handled by a check-mark on a card each pay day.

Plenty of help available. Although this is *your* plan when you put it into effect, the Treasury Department is ready and willing to give you all kinds of help. Local civilian committees in 48 States are set up to have experienced men work with you just as much as you want them to, and no more.

Truly, about all *you* have to do is to indicate your willingness to get your organization started. We will supply most of the necessary material, and no end of help.

The first step is to take a closer look. Sending in the coupon in no way obligates you to install the Plan. It will simply give you a chance to scrutinize the available material and see what other companies are already doing. It will bring you samples of literature explaining the benefits to employees and describing the various denominations of Defense Savings Bonds that can be purchased through the Plan.

Sending the coupon does nothing more than signify that you are anxious to do *something* to help keep your people off relief when defense production sloughs off; *something* to enable *all* wage earners to participate in financing Defense; *something* to provide tomorrow's buying power for your products; *something* to get money *right now* for guns and tanks and planes and ships.



France left it to "hit-or-miss" . . . and *missed*. *Now* is the time for *you* to act! Mail the coupon or write Treasury Department, Section A, 709 Twelfth St. NW., Washington, D. C.

FREE - NO OBLIGATION

Treasury Department, Section A,
709 Twelfth St. NW., Washington, D. C.

Please send me the free kit of material being used by companies that have installed the Voluntary Defense Savings Pay-Roll Allotment Plan.

Name _____

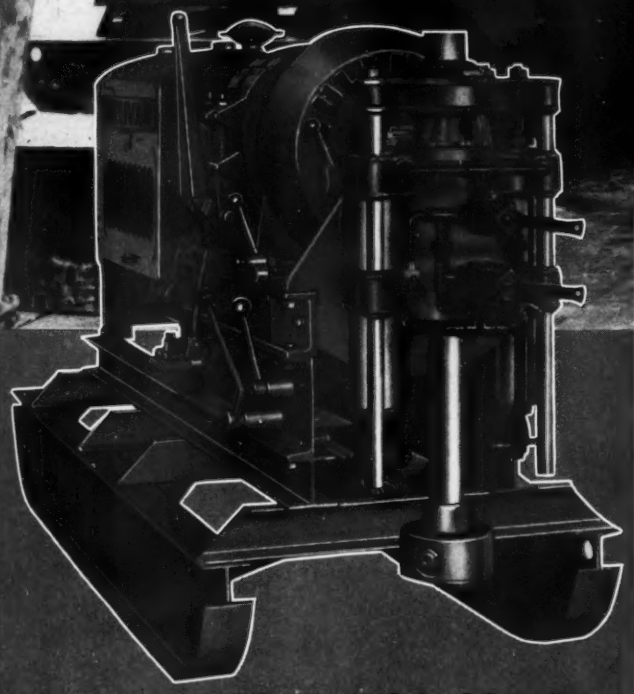
Position _____

Company _____

Address _____

GPO 428498

SULLIVAN 22-HD CORE DRILL



Sullivan No. 22-HD Core Drill, gasoline engine powered, equipped with hydraulic swivelhead and built-in oil circulating system. Mounted complete on steel skids.

The 22-HD CORE DRILL is a rugged, heavy duty machine built for drilling in all formations. Its compact design and modern alloys insure maximum portability and comparatively light weight. The 22-HD incorporates every modern design feature that contributes to faster drilling, lower maintenance and greater safety. NO OTHER CORE DRILL OF EQUAL CAPACITY OFFERS ALL THE ADVANTAGES FOUND IN THE 22-HD. CONSERVATIVELY RATED AT 1750 FT. CAPACITY WITH "E" RODS. Write for Bulletin D-28.

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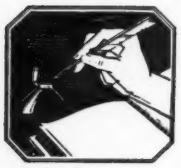

YEAR-END REPORT TO CYANAMID CUSTOMERS

1941 has been a year of unprecedented expansion of mining and milling to feed the furnaces and forges of a metal-hungry world. Despite the pressure for ever-increasing production of metals and non-metallics, the constructive forces of research and engineering have nevertheless made progress that will continue to benefit mankind long after the dislocations of today have been recorded in the history books of tomorrow.

Privileged, through the friendly cooperation of the mining world, to become an important supplier of the tools of mineral beneficiation, it is only proper that Cyanamid render an accounting of its stewardship in this year of unparalleled activity.

★ ★ ★

DURING 1941 Cyanamid continued its long-term program of reagent research. Aerofloat Flotation Reagent 33 — a strong promoter for lead and silver sulphides—was developed and has found application in several mining districts. The field of usefulness of Aerofloat Flotation Reagent 242 was considerably extended in the treatment of gold, silver and lead-zinc ores. Although it is a strong promoter for sulphides, it produces a froth

AMERICAN CYANAMID COMPANY

which is remarkably free from gangue. As an added advantage, its inherent frother characteristics reduce the consumption of auxiliary frothers.

During 1941 Cyanamid added reagent production capacity while maintaining its high standards of quality, so that despite the many uncertainties of chemical raw-materials and transport the mining industry has had an adequate supply of reagents.

In 1941 Level Type Fagergren Flotation Machines were specified or installed by a number of large copper, zinc and non-metallic concentrators. This acceptance of the new Level Type Fagergren resulted from its important advantages of simplified design, greater operating efficiency, reduced operating and installation costs.

And to climax a year of progress, Cyanamid expanded its activities to include Technical and Sales Service throughout the world on Heavy-Media Separation (Sink-Float) Processes, employing both ferrous and non-ferrous media. In these times of urgent demand for both metallics and non-metallics, the addition of Heavy-Media Separation to an existing flow scheme offers a proven, low-cost method of preconcentration of mill feed to produce larger output from existing concentration equipment, or, an economic process for concentrating sub-ores and waste products that have hitherto been too low-grade for treatment. In addition, Heavy-Media Separation may produce savings in mining costs by permitting less selective and lower cost mining methods. Laboratory and mill results indicate that Heavy-Media Separation will have wide applicability in producing directly a marketable concentrate. This should be particularly interesting to producers of strategic non-metallics.

Cyanamid now offers to the entire mining industry the services of its expanded Ore Dressing Laboratory and its Field Engineers to assist in determining the economic application of Heavy-Media Separation (Sink-Float) Processes, as well as chemical beneficiation, to mining and concentration problems.

★ ★ ★

In the year ahead Cyanamid confidently hopes and expects to provide the mining industry with an even better and broader technical service and a reliable source of supply for a comprehensive line of metallurgical chemicals through Cyanamid Field Engineers, the Cyanamid Ore Dressing Laboratory and Cyanamid production facilities.

Cyanamid continues to base its future welfare on the simple policy of always keeping the welfare of the mining industry as the essential purpose of Cyanamid Service to Metallurgy.

30 ROCKEFELLER PLAZA, NEW YORK

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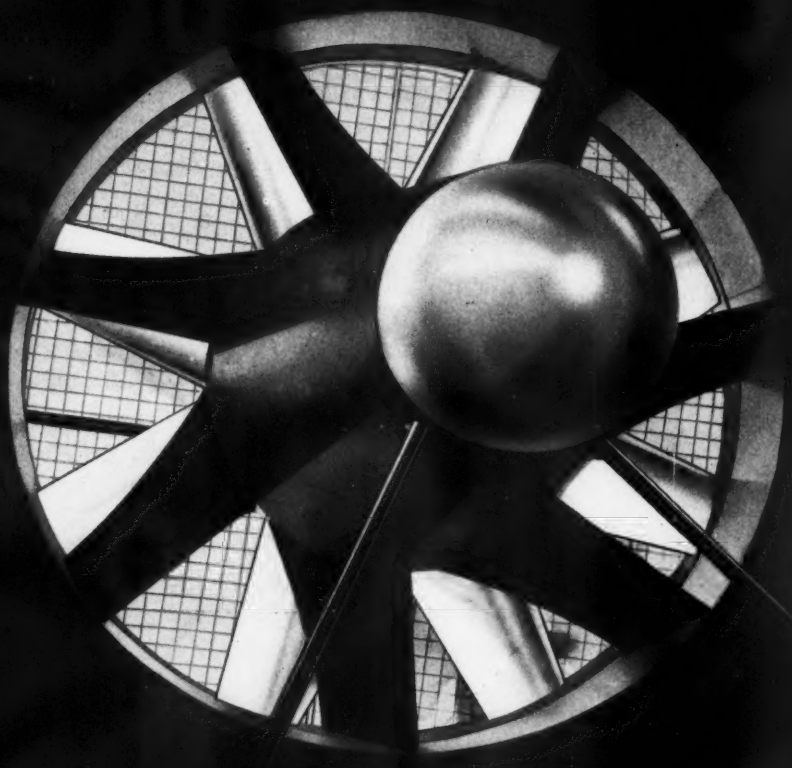
AERODYNE

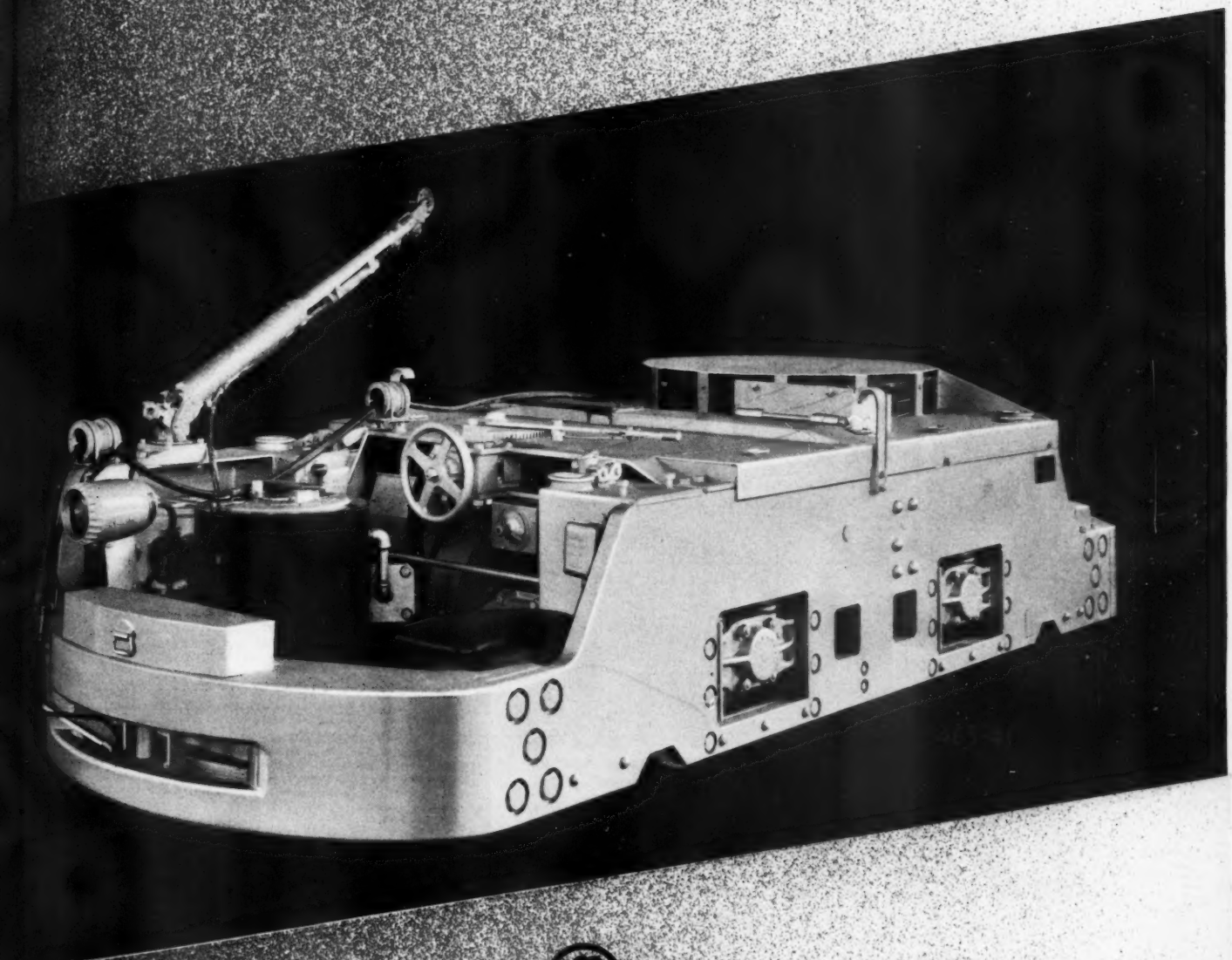
VENTILATION

STATIC EFFICIENCY OVER 80%



TRANSPORTATION

TROLLEY AND BATTERY TYPE LOCOMOTIVES FOR HAULAGE AND GATHERING SERVICE



THE JEFFREY MANUFACTURING COMPANY

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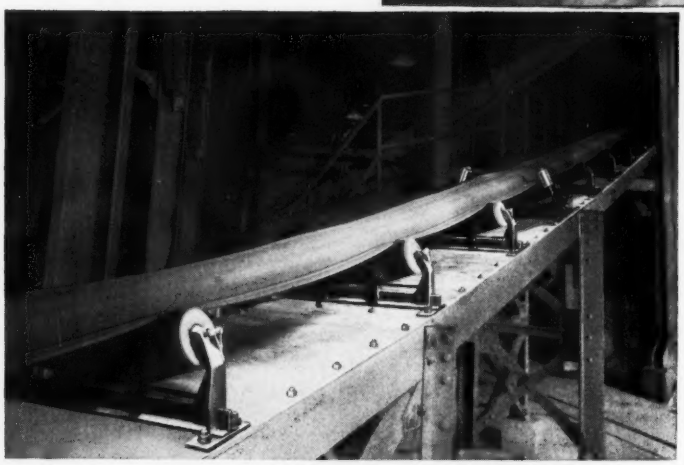
1200 Tons of Crushed Ore Handled Daily With LINK-BELT BELT CONVEYORS at Sigma Mines

Action photograph of one of two 36-in. wide belt conveyor feeders handling crushed ore from mill ore bin to collecting conveyor shown in lower illustration. Each feeder conveyor may be operated at 10 to 30 feet per minute through a Link-Belt P.I.V. Gear variable speed transmission, worm gear speed reducer, and encased Silverlink roller chain drive.



18-in. wide collecting belt conveyor operating at 150 feet per minute, handling crushed ore to rod mill from the two conveyors in upper illustration.

● Sigma Mines (Quebec) Ltd., Bourlamaque, Que., are keeping production "on the move" 24 hours a day, handling approximately 50 tons of crushed gold ore per hour, from mill ore bin to rod mill, on Link-Belt anti-friction belt conveyors. This includes two slow-moving 36-in. wide feeder conveyors under bin, and an 18-in. wide collecting conveyor to which the two feeder conveyors discharge.

All three conveyors use Type 70 Troughing type carrying run and Type 71 return run idlers, and are driven through Link-Belt mechanical power transmission units. The two feeder conveyors are each equipped with a Link-Belt P.I.V. Gear variable speed transmission.

You too can profit by Link-Belt's long experience in solving conveying and mechanical transmission problems — whether for new or modernization installation needs.

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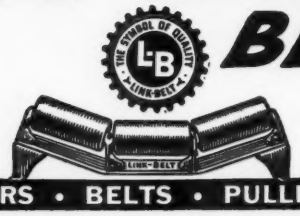
LINK-BELT BELT CONVEYOR EQUIPMENT

A TYPE FOR EVERY SERVICE



IDLERS • TRIPPERS • BELTS • PULLEYS • BEARINGS • TAKE-UPS • DRIVES

A JOURNAL FOR THE ENTIRE MINING INDUSTRY—PUBLISHED BY THE AMERICAN MINNG CONGRESS

MINING CONGRESS JOURNAL

Vol. 27 DECEMBER, 1941 No. 12

MANGANESE AND CHROME ORE PURCHASES

UNCERTAINTY and confusion have existed among domestic producers and potential producers of strategic and critical metals regarding the quantities, specifications and prices for ores or concentrates which the government needs; particularly in regard to the grades which the Metals Reserve Company is prepared to accept, and the prices which that agency will pay. Heretofore, producers have been asked to submit a statement of quantities and grades they were prepared to furnish, and to submit a bid based on cost of production plus a reasonable profit. In each case the specifications and prices were considered by the Metals Reserve Company and either accepted or rejected. This practice has retarded production and worked a hardship on the operator, who had to make heavy investment in preparations to produce, without knowing definitely whether his product would be acceptable and salable.

The American Mining Congress has been pressing for a more definite treatment of this problem, and the recent Metal Mining Convention at San Francisco in its Declaration of Policy urged that, "Agencies of the government charged with purchasing strategic and critical minerals furnish the industry all available information regarding demand, specifications, and prices."

The position of the mining industry as thus expressed has received recognition in a statement just issued by the Metals Reserve Company defining in detail the specifications, price schedules, conditions of shipment and delivery, sampling and analysis which will be included in standard contracts for the purchase of manganese and chrome ores.

This is a great step forward in the procurement program, and will allow present and prospective producers of these two necessary minerals to proceed on the basis of full information and with assurance as to the possible returns from their labors.

THE IRREDUCIBLE MINIMUM

IN driving piles, the last few feet of penetration usually require proportionately much greater effort and energy than the first few feet.

Statistics on fatality rates in coal mines indicate that the point has been reached, just as in pile driving, where a much greater expenditure of energy is required to continue to show decreases in these rates. Theoretically, there may be a point—an irreducible minimum—beyond which the rates will show "refusal"; practically, past experience has shown that they are responsive to accumulative effort.

In the years 1930 to 1940, inclusive, the combined fatality rates in bituminous and anthracite mines per million tons produced, on an annual basis, have been as follows: 3.84, 3.31, 3.36, 2.78, 2.94, 2.93, 2.73, 2.83, 2.79, 2.41, and for 1940 (preliminary) 2.71, according to the statistics of the U. S. Bureau of Mines. Thus, from 1930 to 1940 a commendable reduction was made, from 3.84 to 2.71; but comparing 1940 with 1933, the reduction has been only .07, and in four of the seven years since 1933, the rate has been higher than in that year.

Has the irreducible minimum been reached? Far from it! These figures only show that now the input of energy must be on a greatly expanded scale. Additional forces of education and of persuasion must be brought to bear on the head of the pile, to drive it deeper; for, after all, we are not dealing with inanimate objects and lifeless statistics, but with human lives—with the sorrow of families bereft of wage earners, and with the startled agony of men caught underground by the flash of an explosion or the swift paralysis of afterdamp.

There must be no irreducible minimum! The Bureau of Mines, just now getting under way the machinery for Federal coal mine inspection, has long been a potent aid in reducing accidents. With increased personnel it can give an added impetus to keep pounding accident rates lower. The Bureau needs the cooperation and help of the coal industry. If antagonisms develop, part of the potential value of the Bureau's work will be lost. The industry, state coal mine inspection services, and the U. S. Bureau of Mines, striking the pile in harmonious rotation, can accomplish far more than any one of them acting alone. There must be no reluctance, and no admission that the irreducible minimum has been reached.

View of Climax Molybdenum Company property

MINE ACCIDENT PREVENTION in the Present Emergency

By JAMES K. RICHARDSON
Safety Director
Climax Molybdenum Company

A common sense and factual approach to the questions of accident prevention and mine safety is that which Mr. Richardson herewith presents. He is not only one of the leaders in the country in the progressive application of accident prevention methods but he is also articulate and interesting in discussing them.

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MOST mine operators hear the same things about accident prevention day in and day out. However, it has been my experience that most writers have a purely idealistic viewpoint. Having attained a small measure of experience in dealing with mining officials and mine employes, I no longer feel that I am a "knight in white armour" destined to save the world in spite of itself. The flattering phrase which described me, and my efforts, as a "safety-humane-economist" was appreciated due to my having always concurred in the theory that any worthwhile effort should pay its own way and be sold on its economic value.

The Aim Should be "Progress with Safety"

It was my privilege, recently, to hear a talk by Colonel Chevalier on the subject of "safety." He made a statement which crystallized many of my own ideas on accident prevention work. He suggested that the old slogan "Safety First" be discarded and in its place be substituted the slogan: "Progress with Safety." I am in thorough accord with that thought. Were we conscientious advocates of "Safety First," we would never rise in the morning. Despite the fact that more people die in bed than anywhere else, we would be at any rate relatively free from the possibility of an industrial accident. How could we conscientiously open our mine portals on any morning? In other words, only with everything down and no men employed could we be 100 percent advocates of the principle "Safety First." The world must move ahead—industry must progress and produce to survive. Let us fulfill our destiny as to progress and production as safely as possible.

Accidents Cause a Tremendous Production Loss

Factual information concerning the accident problem with which industry as a whole is faced is of great interest. In 1940, industrial accidents in the United States resulted in 17,000 deaths, 93,000 permanent disabilities, and 1,250,000 temporary disabilities. Without reference to those who were killed or those who were taken out of temporary employment through the loss of hands, legs, eyes, and other crippling injuries, the temporary disabilities alone caused a direct total loss of 200,000,000 man-hours of production. Since skilled and semi-skilled workers predominate in most industries, the majority of the accident casualties were in these employment groups. Many of them were in trades and occupations most needed for defense production at this time and, in which definite shortages exist.

For every man-day of idleness resulting from strikes and walkouts in 1940, there were four days lost through work accidents. Strikes and walkouts resulted in 6,500,000 man-days of idleness or an average of less than ¼ of a day per worker. Disabling injuries caused the loss of 25,192,000 man-days, or an average of more than 1 day per worker.

Strikes and lockouts are front page news, but because accidents happen as single minor incidents the interruptions they cause are hardly noticed. Yet in the aggregate, they assume the proportion of a major tragedy far more serious than any other single threat to production schedules.

The men killed in industry cannot be replaced and yet approximately 15 percent of them are skilled workmen. Nor can their lost arms, legs, or hands be replaced; their skill is lost to our production effort forever. What this indirect loss may amount to in terms of production hours can only be roughly estimated. The American Standards Association and the National Safety Council have set up tables of time charges for estimating severity of accidents and upon this basis, the loss would amount to in excess of 1½ billion man-hours of work.

What do these figures mean, let us say, in the production of armament material? A memorandum from the Bureau of Labor Statistics, dated February 1, 1941, states in substance that "had man-hours lost, directly and indirectly, due to industrial accidents in 1940, been put to productive use, the following items might have been produced: 15,000 to 18,000 large bombers; 30,000 medium bombers; 75,000 to 90,000 fighter planes; 112,500 to 225,000 trainer planes (according to type); 450 submarines; 375 destroyers and 45 battleships."

Mining Has High Frequency and Severity Rates

Did mining contribute to this loss? I can only point out to you that figures compiled by the National Safety Council show that mining had, in 1940, the highest severity rate of 31 industries listed; and ranked thirtieth in frequency of accidents.

It is logical to assume that a large percentage of those men killed and injured in our industry were skilled miners, timbermen, trackmen, slusher operators and haulage men. Those men cannot be easily replaced. Our industry trained too few men to fill these jobs during the past ten years, with a consequence that we have no reservoir to draw upon during these critical days. Whenever we are forced to replace experience with inexperience, we are materially increasing our accident hazard and by the same token, lowering our ultimate efficiency.

Problems are Introduced by New Men Entering the Industry

New men, fresh from the "dust bowl," from the beet fields, from the ranches and from other branches of industry, are being placed in environments entirely unfamiliar to them. Judging from past experience, we can expect that as we increase our hours of exposure, we will find a corresponding accident increase. If we must hire inexperienced men, this accident increase in percentage will be greater than exposure increase. Old trained men leave for "greener fields," and must be replaced by partially trained newcomers. There is no question that this situation is critical in our industry, as well as in others, and the solution of the problem can best be met by subjecting our men to vigorous and well planned accident prevention programs.

When the average American citizen thinks of "defense industry," he thinks of the manufacturer producing planes, tanks, rifles, ammunition and other items in fabricated form. Sight is lost of the fact that mining is the basic industry where the steel for tanks and rifles originate; the origin of aluminum for our planes, the copper for our shell casings and ignition systems; the molybdenum, tungsten, nickel, vanadium and manganese so essential for proper strengthening of the steels; the lead and zinc vital throughout in the production of armament material. Not just the large mines, but thousands upon thousands of small mines are producing these basic ingredients. Without their combined production, certainly our national defense effort would be slowed if not brought to a standstill. Consequently, the safeguarding of key men in mining is as vital to national defense as protecting the steel fabricator or machinist.

Mining has always been a hazardous industry, and early recognition was given to some of its hazards. There exist records of periodic inspections made at the Rio Tinto Mine in Spain prior to the dawn of Christianity. Agricola's "De Re Metallica," published in 1555, refers specifically to the dangers of foul gases and poor ladderways. Agricola and his successors, for more than 300 years believed in the existence of goblins and witches, and many of mining's mishaps were attributed to supernatural influences. Only within comparatively recent years has our industry recognized the fact that mining hazards are susceptible to scientific analysis and control.

Small Operators Must Realize That Accident Prevention Pays

My enthusiasm toward accident prevention work is, perhaps, more natural than I should expect from the operator. After all, the small operator knows that he has an accident problem, yet he feels that an accident prevention program is a luxury which can only be afforded by the large operator.

I feel as though I know something

Loading a Granby type car; Climax mine

of the problem confronting the small mine. My early experience was in those mines which were originally developed and opened with one thought in mind—get a hole in the ground that the potential stockholder can see! Every one of these operators was waiting and hoping for the day that the vein would widen. The maximum ore reserves amounted to possibly five truck loads and any one of those operators was fascinated by any mine which had a thousand tons of ore in sight. Compensation premiums were always too high, and took a large slice of the possible profit. Yet only one of these operators, to my knowledge, ever did anything about his accident problem. The rest of them are still bewailing the high compensation premiums, not stopping to realize that those premiums are "monsters" of their own making.

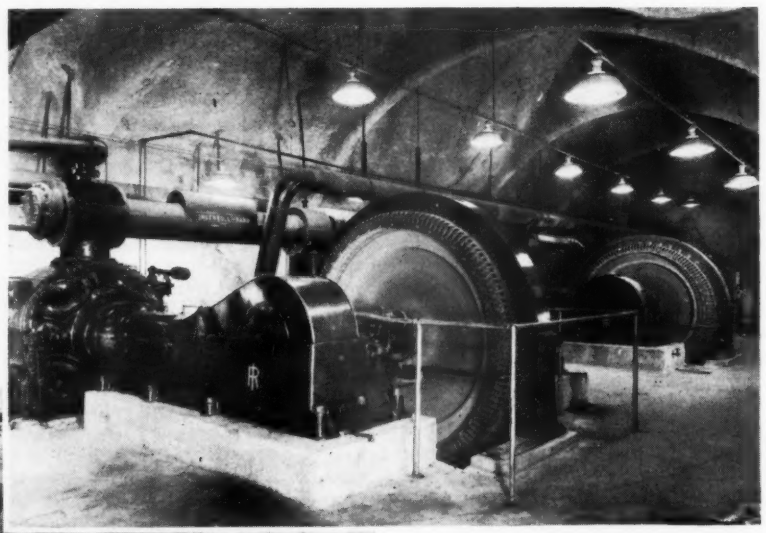
This one property that I referred to, decided to do something about the situation, and asked me for help which I gladly gave them. They could have, however, received essentially the same advice from their Mine Inspection Department or from the United States Bureau of Mines. One of their bosses was designated, in addition to his other duties, the safety inspector. They held regular "before shift" safety meetings with their men and encouraged suggestions. Suggestions made were always acted upon or a good reason was given for not doing so. When a man was injured, the workmen decided, with the safety inspector, what the cause had been and what should be done to prevent a recurrence. All the men wore hard hats and protective footwear. The scrap was cleaned up in the yards and in the underground workings—not all at once, but following some definite plan.

During the year just preceding their attempt to reduce their accident severity, they had cost their insurance carrier $7,400 in compensation paid out or set up in reserves. Their compensation rate was $7.95 per hundred dollar pay roll—$1.44 above the manual rate.

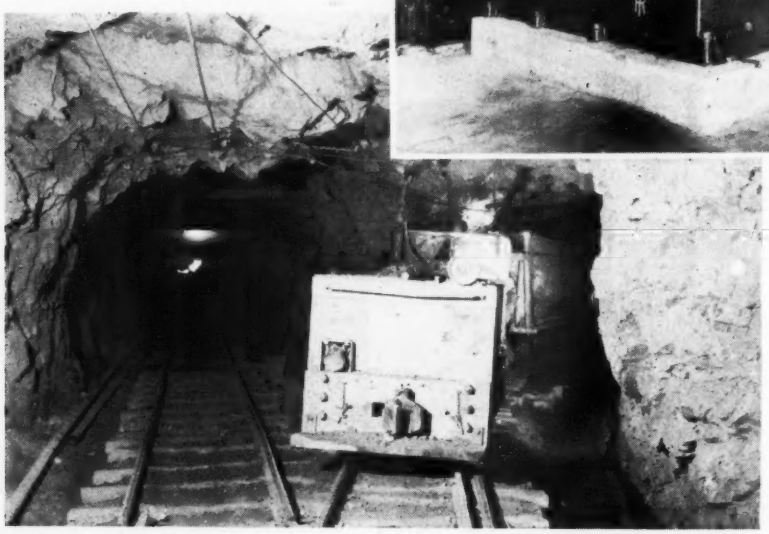
Their first 8 months' experience during 1941 has been extremely interesting. They have, as pointed out, followed a plan of education and enforcement in eliminating their accidents. They realized in the sale of scrap material and salvaged material over $8,650 from the yards. Their total cost to their insurance carrier to date, has dropped to $46. They will unquestionably receive a dividend from their carrier this year, and have been assured that their 1942 rate will be reduced to approximately $3.40 per hundred dollar pay roll if the present record is maintained. Figures on production show that their cost per ton in 1939 was $4.05 per ton. This cost has dropped to $3.62 so far in 1941. "Tons per man-shift underground" has risen from 1.7 to 2.2. This has all come about through a directed action. The cost to the operator has amounted to approximately 2c per ton. Do such savings appeal to you? Such savings and improvements in efficiency often mean that a mine can operate.

Insurance Compensation Costs Can be Reduced with Effective Safety Work

I realize that the cost of compensation insurance is high. I feel, however, that insurance costs have not yet reached their peaks, as more and more of our Western States are enacting occupational disease laws. The man employed by the small operator should be subjected to the same sort of physical examination and accident control program as found in larger organizations. If the same standards are not maintained, the eventual bill to be paid by the small mine will be out of proportion to the exposure offered. My suggestion in such a case would be



Above: Compressor station



Left: Haulageway Climax mine

for the small operators in certain districts to band together and secure the services of competent medical and safety men to safeguard their interests. I firmly believe that such a program is feasible and should be seriously considered.

Far be it from me to attempt to "sell safety" on a purely economic basis. I am well aware of the fact that its most dramatic appeal to any man is that based upon its emotional value. Frankly, the humanitarian angle is the highest plane upon which any such movement could be based. I have often quoted those words of P. B. Juhnke, where he said: ". . . and the end is that the workman shall live to enjoy the fruits of his labor; that his mother shall have the comforts of his arm in her age; that his wife shall not be untimely a widow; that his children shall have a father and that cripples and helpless wrecks who were once strong men shall not longer be a by-product of industry."

I feel there is nothing which will make any mine superintendent or official more safety conscious than to be called in the middle of the night and told of a fatal or serious accident. His next step is to get in his car and go to the home where a mother or wife is peacefully sleeping. Picture in your mind's eye, the wife and children coming to the door in answer to his knock. Have you ever seen that look of utter terror and hopelessness in a woman's eyes as she is told of her husband's untimely death? If that picture fails to make any man safety conscious, words will always fail. There is no more wonderful feeling than that of not being afraid of a telephone ringing after 8 o'clock at night.

Despite these emotional appeals, I would like to disregard them and offer more concrete evidence that accident prevention work will pay from a "dollar and cents" standpoint.

Experience of Climax Company Illustrates That Accident Prevention Returns More Than the Cost

I have offered as one example, a small operation. I should like to offer as a second example, the experience of our company which has wholeheartedly gone into this important phase of operations. I sincerely feel that our work typifies the progress which our industry is making along the line of accident prevention.

Our organization was awarded a plaque by the Colorado Industrial Commission for the best safety record in large metal mining operations during 1939. We were awarded a Joseph A. Holmes Safety Association "Certificate of Honor" for 1940. Our first aid teams have won first place in the Metal Mining Division at each state first aid meet held. Upon looking over our tonnage record, we find that we have produced, from an underground mine, in excess of 6,000,000 tons without a fatality or a permanent total disability. During 1940, we produced approximately 130,000 tons per lost time accident.

Like most metal mining operations in Colorado, our company is insured by the State Compensation Insurance Fund. We operate under what is known as an "ex-medical" policy. This means that we furnish all medical care and the Fund handles all compensation, dental and miscellaneous costs. During one particular year, the Fund paid out or set up as reserves $48,-521.93 to handle our accidents. On a tonnage basis, this was equal to 1.2c per ton. During 1940, we find that the Fund paid out or set up as reserves $6,135. This is equal to a cost of 1.6 mills per ton. For the years compared, our cost to the Fund dropped $42,000. This saving to them will be reflected in our savings due to the "experience rating" plan in force in Colorado.

We have all heard the theory advanced by major compensation carriers that the indirect costs were four to five times the direct costs. If this is true, we can figure that we have saved ourselves approximately $200,000 for those years compared, which is wholly due to safety work.

The cost of maintaining an accident prevention program is considerable, but not excessive. Data on costs are far from complete due to many conflicting elements entering into the cost of mining which pertain to safety, such as supervision, ventilation, timbering, etc.

R. J. Boone, a recent graduate of Colorado School of Mines, has written a thesis upon accident prevention work, and in it, gathered together much data on the costs of various programs in 11 different operations. These costs vary from 1.9c per ton to 2 mills per ton, the average cost being 8.5 mills per ton. This seems to be about correct, as our cost, including salaries, first aid training and supplies, safety meetings, bulletin boards, awards, protective equipment furnished and miscellaneous items, amounted to 4 mills per ton during 1940. As can easily be seen, the cost of the program is decidedly less than the amount paid out after the accidents have occurred.

Improvement in Operating Costs Parallels Reductions in Accident Frequency

Many persons feel that accident prevention and the efficiency of an operation do not "tie-in." Upon reviewing our production costs, we find that over a period of years, our costs have decreased 33 1/3 percent. During this same period of decreasing costs, our accident frequency dropped 36 percent. We find an amazing parallel existing between our cost and frequency curves when plotted. We do not maintain that safety was the sole factor in producing these lowered costs, but we do feel that it contributed greatly and believe that the two, safety and efficiency, are one and the same thing.

The Industrial Hygiene Foundation of America (formerly the Air Hygiene Foundation) in which our organization holds a membership, has estimated that 1,000,000,000 man-hours will be lost in 1941 in heavy industries alone, due to sick absenteeism. This amounts to 500,000 workers at full time. Their statistics show that the average worker is losing about 8 days a year through illness and for every day that figure can be reduced, there will be a gain of 120,000,000 man-hours, equivalent to the services of 60,000 workers at full-time.

Reducing oversize on grizzly

Many ways are open to us all to reduce this toll in our industry. Our program toward reducing this figure at Climax has been to provide our employes with better working conditions in the form of improved ventilation and dust control work; adequate, modern, medical control with its knowledge of the working conditions which contribute to illness; education of the workman in personal hygiene; modern change room facilities; and many other items, all of which help procure the desired result. These things help to create in your employes a healthy respect toward you as a thoughtful and considerate employer who is desirous of allowing the employe more working shifts during any current pay roll period.

It seems unnecessary to go into the details of the methods we follow in getting these results. Our methods have been given wide publicity in this organization's JOURNAL, in the *Engineering and Mining Journal* and in various other trade publications. Frankly, I feel that it should suffice to say that the program is a relatively standard one. The only factor which I think is outstanding is the fact that our management is thoroughly "sold" on this work and looks upon it as though it were any other operation in the plant. That seems to be the weak point of many programs.

Sometime ago, the president of one of our largest western coal companies made the statement that safety had paid them substantial dividends. The mines of this organization have enviable safety records extending over a period of 18 years. He specifically pointed out that compensation awards at his mines had amounted to approximately 1.5c per ton while the awards covering all commercial mines in his state had amounted to 2.5c per ton.

The cost of accident prevention work at Antamok Goldfields Mining Company at Baguio, P. I., is not available at this time, but their enviable record of having worked 1,358,272 man-hours underground without a lost time accident stands as a monument to management. It is certainly a goal for all operations to attempt to attain.

A Conscientious Approach to This Problem Also Improves Employe-Employer Relationships

I have tried, herein, to give you some examples showing what some organizations are doing to whip their industrial accident problem. The result has been that they have materially improved their relations with their employes as well as making accident prevention work show a definite profit. There is, let me repeat again, one mighty stumbling block in all organizations today which vitally affects their endeavors to improve from both safety and efficiency standpoints. Labor turnover is a problem, the importance of which cannot be overemphasized. Some of our best workmen are leaving for "greener fields," with the result that we are throwing into the breach men who are improperly trained. Our experienced men who stay are being given more and more work; the tough jobs, the dangerous jobs; so that in some cases they are too rushed to handle their work properly. As a result, they become careless and dissatisfied. This situation, as pointed out before, can best be met by employing scientific accident control. Our supervision must be improved upon and made more effective than ever before; the supervisors must be trained in the fundamental principles of industrial relations; and they must be teachers who can show men how to do work safely and efficiently. New men must be developed for new jobs and a wise shift boss can do this job more efficiently than you or I.

"Safety and Efficiency Mean the Same Thing"

In conclusion, allow me to quote from a letter which I recently received from a very good friend. This man is the manager of several mines operating in Michigan; his mines are known as efficient and safe producers. I wrote him and asked him about the practical aspect of accident prevention work, for I knew that his enthusiasm for safety was matched only by my own. He says:

"I am assuming, Jim, that when the question is asked that the one to reply is 100 percent for safety. There are no practical aspects unless you go 'whole hog' on the idea. However, here are points I believe pertinent:

"1. The morale of the entire organization is better. Men begin to feel that perhaps the employer does consider them human beings, and perhaps he is trying to make work more interesting, and does want to know what workmen think about their job.

"The morale of your community is much better. People talk favorably about your organization for a change.

"2. A safe mine is a clean mine. This is, in my opinion, the first result of safety. Cleanliness means more 'dirt' for us.

"3. Increased production is natural to cleanliness and safety. I can't think of it in any other way.

"4. Safety training and education gives the foreman a better understanding of his job and helps enlarge his ideas of what management is trying to do. Where safety is a major consideration, the various bosses come in contact with the higher supervisory officials at frequent intervals with the result they become more intelligent, ambitious and agreeable bosses.

"5. There is no need to mention who takes the injured miner's place—a 'greenhorn.' But there I go back to production again.

"So much more can be said, for to me, it is obvious that safety and efficiency mean the same thing in any ordinary operation. The saving reaches in so many directions to say nothing of the saving in money outlay for injuries without any return in production."

That letter is one organization's story; I have given you the story of the small gold mine, the coal mine and the foreign mine. I have related our experience, and wish to say that our record has given us much satisfaction. Beside the pleasure and pride we derive from a good record and its consequent results, it is gratifying to justify our efforts by knowing, beyond question, that the Safety Department is a self-sustaining unit. There is nothing phenomenal about our record and we know that any operator can enjoy the same experience if he elects to do so.

Our industry must do its part in reducing the terrific toll being paid to accidents. We must do our part toward keeping men in the production line during these trying days. We owe our stockholders and our men certain things—good will and reasonable profits. Not only is safety something that cannot be overlooked economically, but a good safety record is concrete evidence of patriotism and good Americanism.

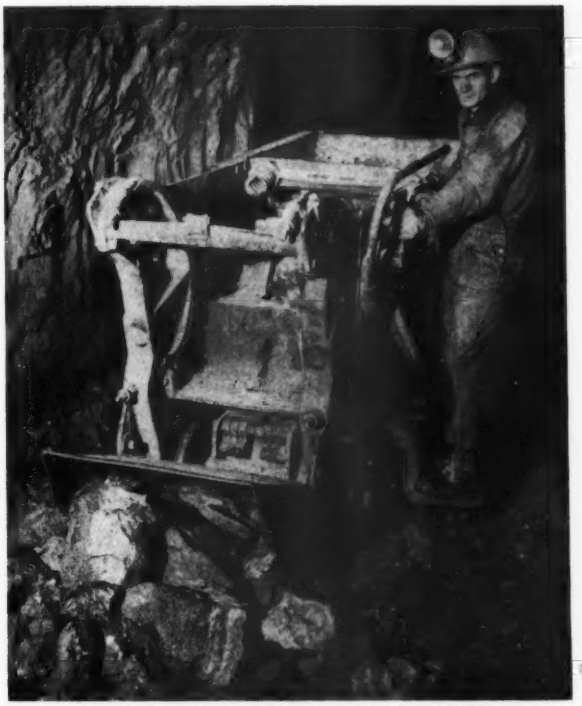
Large Magnesium Deposit Available

Milnor Roberts, Dean of the School of Mines, University of Washington, recently reported to Senator James E. Murray of Montana, a member of the Senate Military Affairs Committee, that tremendous quantities of olivine are present in the Twin Sisters Mountains of Whatcom County, Washington. He said that plans were under way to test a process for treating the olivine to produce magnesium, and that the olivine contained magnesium in about the same proportion as magnesite.

Twin Sisters Mountains are west of the Cascade Divide and ten miles southwest of Mt. Baker.

UNDERGROUND MECHANICAL LOADING

By JOSEPH A. WILCOX
Superintendent
Shattuck Denn Mining Corp.
Bisbee, Ariz.



Loader at work in a zinc-lead mine in New York state

Some form of mechanical loading has become almost standard practice in all mines where the material must be elevated into the transporting medium. In some cases, where chutes and chute sets are hard to maintain, the ore is allowed to flow to the floor of stub drifts, and handled from there to car or conveyor by mucking machine or loader.

Mr. Wilcox concisely discusses some of the factors to be considered in applying mechanical loaders or muckers successfully.

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THE mining industry has, in most cases, accepted underground mechanical loading as a necessary requisite to efficient operation. All large producers use some form of mechanical rock handling, and many smaller operators are entering that phase of modernization. This trend is attractive for several reasons—the reduction in labor, less effort for the workmen, actual reduction in costs of loading, and by a few, it just is the thing to do.

Of the three general types of underground loaders, namely; conveyor system, slusher-scraper, and mobile lift loaders, the two latter are most widely used. The conveyor is the most cheaply operated and most expensive to install. It is only applicable where large tonnages are to be moved between two specific points and because of its less common applicability to underground mines, will not be further discussed.

The slusher-scraper method is used almost exclusively in stopes. Here it is available for many applications. The types and sizes to use are a matter of adaptability to the place and kind of work to be done. These should be discussed as a separate topic because of their extensive and varied use.

The underground loading machines of the shovel-lift type, such as the Eimco, have become standard equipment in many mines, and for those mines which have used loaders for some time, little can be said that has not already been brought to their attention. To those operations where expansion is planned, those where this type of equipment is being contemplated as modernization, and new mines now being started, the advisability of their acquisition will depend on a study of the conditions to be encountered.

Have You Enough Work for the Machine?

The first consideration is: Have you enough work for the machine? By this I mean, how much tonnage do you wish to move? Is this tonnage all in one place, such as in a long tunnel? If not, is it in a reasonably contiguous place, or is it in several scattered locations that require continual moving of equipment? It must be remembered that the underground loader is a mass production machine and where there is insufficient work for it to do, it becomes an expensive luxury. Likewise, the type of labor available is of major importance. Where labor is scarce and of high cost, machine loading might be economical, while in places where plenty of cheap labor is available, the old-fashioned mucker may prove to be the best. A crew of two men with a loader of the small type will easily clean up two 6 ft. by 8 ft. headings in a shift and care for the track if the headings are close to one another. In some cases, three headings may be cleaned. Where large muck piles from stopes are be-

Above: Loader operating in East Portal of the Continental Divide tunnel, where advance of 74 ft. has been made in 24 hours, in 12 x 12 tunnel

ing loaded, one crew of two men may load 130 one-ton cars in a shift. This now leads us to another phase of this discussion. What does this increase over hand loading do to the rest of the mine operation?

Loaders May Overtax Other Operations

Assume that two men with a "loader" will load as many cars as six good muckers. To keep the crew busy it will require additional tramming facilities and if cars are loaded on cages, perhaps an increase in hoisting capacity. Where tramming is more than a short distance, extra men will be required to keep the loads moving out and sufficient empties to service the loader. The alternatives to this are double tracks or branch tracks kept fairly close to the face where cars may be stored, or motor tramming, which in either case calls for an investment in motors, cars, extra track, etc. At the shaft, if cars are hoisted to the surface, unless large stations are available, this surge of material to the shaft may choke the stations, empty cars may not be available and again we revert to the idle machine and its crew of highly paid employes. So we see that to modernize the mine by acquiring "loaders" might lead to confusion in operation; it may cut the number of men loading, but it may increase the number of men tramming or involve revamping of tramming facilities. It is assumed that the machines will increase output or do the same job quicker. If your men cut an eight-hour operation to four hours, then you must provide other work for them or pay for idleness. On the other hand, if you provide enough work to keep them at the face eight hours, then your entire plant must speed up, and this speed-up may mean complete mechanization with its attendant investments, repair work, replacement stocks, and perhaps enlargement of shops.

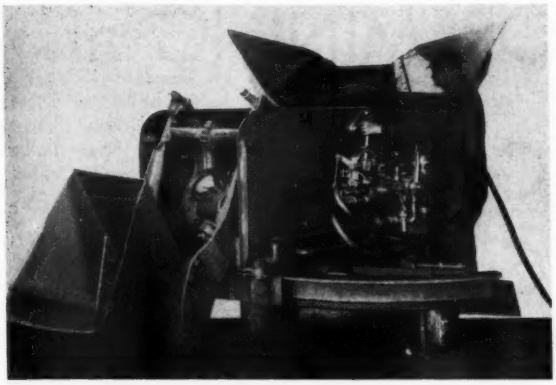
Right: Loader fills 84 cu. ft. car in 3 to 4 minutes

Mechanical Loading May Affect Grade of Ore or Size of Material

A further condition to good results with "loaders" depends on the type of material to be loaded. Where only waste material is loaded, sizing is the only feature that might be involved. However, where a face is being cleaned that has ore and waste blasted together, no sorting can be done, with resultant dilution. In mines where veins are narrow this dilution may be very costly. To blast the ore and waste separately, the machine must be brought to the face twice, which results in a great deal of lost time. In mines where a sizeable proportion of the ore is from rill stopes or gouge stopes, and the ore normally requires sorting, loading mechanically very likely will reduce the grade to a point where the ore cannot be mined profitably. Modern loaders can handle pieces weighing several hundred pounds, but it is a mistake to expect successful operation where rock is very coarse. The finer the rock can be blasted, the better the operation.

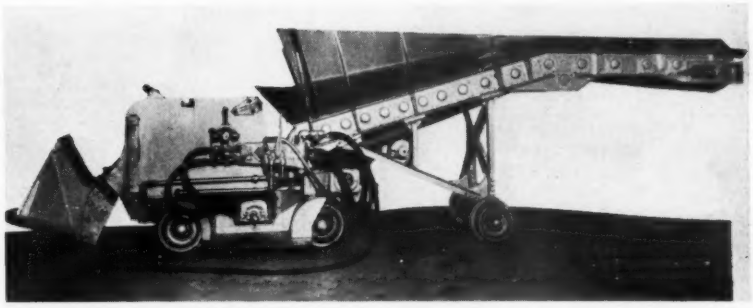
Mine Should be Reconditioned to Permit Mechanical Loading

Equipping the mine with underground loaders brings to light many things that seemed unimportant previously. Much thought should be given to the physical condition of the property. First, we might start at the shaft. In mines where the cages are small, it may be impossible to get the loader into the mine without dismantling. Just to get it down doesn't solve the problem as with a big pump. Loaders get terrific use and must go to the shops for repairs. Perhaps they are needed on more than one level. Dismantling loaders is not a short job. This means that the cages must accommodate the loader quickly. Now that we have the machine underground in good shape, how about the drifts and crosscuts? Have they been cut large enough for the machine to pass



Left: Shovel-lift loader

Below: The new Eimco "Tunneloader"



through? Many chutes may be too low for clearance of the machine, and sill sets may not be sufficiently high to raise the chutes. Pipelines may be too close to the track or too low overhead. In the days of hand mucking and tramming, track curves were short, maybe too short for the loader to negotiate, thus new turn-outs with a greater radius may be necessary. If the mine is equipped with very light rails, heavier ones may be required. These things are all involved when an old mine is to be revamped for mechanical loaders, and if planning reveals that these difficulties do not exist, one phase of adaptation is overcome. If these do exist the cost of revamping the mine must be compared with the benefits to be derived. Where a new mine is to be opened up, or where large tunnel jobs are anticipated, these troubles should not exist.

Men Accustomed to Machine Loading Dislike Hand Loading

From experience I have noted numerous other involvements. Men who once could and would wield a shovel with dexterity, developed a nausea toward or became allergic to a shovel after they had operated a loader for sometime. They find many ways to avoid so dangerous an implement. Ridiculous as this may sound, it is a basis for thought. If employes once start to use mechanical loaders, they do everything possible to avoid loading by hand, and where continuous work on the loader is impossible, this condition will materially affect an employe's productiveness.

Now that attention has been called to the pitfalls, let us look at some of the advantages. Production can be speeded and labor cost reduced by the underground loaders where they have been wisely installed. Where foresight has been used to determine the real need for them and cognizance has been taken of the many adjustments in the plant and the handling of material after loading. there is little question as to their superiority over hand methods. The mechanical loader may involve motor tramming and increased rolling stock. Even so, the investment for these are worthwhile if tonnages to be moved are great enough. The shovel will always be used where mining is done, but in larger old mines and in the new, small mines where adaptation to mechanical loading can be part of the development of the mine, there is little excuse for hand loading methods. For the leaser and the prospector, the shovel is still indispensable.

With the exception of jobs such as the Carlton Tunnel, where the cycle of operation is on a schedule and the uses of the machines are not so varied, I doubt whether any figures are available giving the real economic advantage of mechanical loading over hand methods; this is because of the many ramifications mentioned above. But I am sure it is the opinion of all operators who have adopted them, that the cost of loading is less, the work is less tiring, and tonnage can be increased with loaders, all becoming to the age of mechanization and mass production.

Heaviest Duty Haulage Locomotives

Two of the world's heaviest duty haulage locomotives were recently delivered to the Vesta Coal Division of Jones and Laughlin Steel Corporation, Pittsburgh, Pa. It is believed that they are equalled in power by only two other locomotives of such type—two of the same kind which the company has been operating the past four years.

The locomotives, built by the General Electric Co. in its Erie, Pa., works, are 40-ton tandem equipments, each consisting of two 20-ton units easily operated in tandem by means of contactor control and air brakes. Each locomotive has four 150-hp. motors, ventilated to a continuous total capacity of 500 hp.

The regular haul is 7 miles each way, and the profile for the loaded trip varies between 2½ percent upgrade and 1½ percent downgrade. Full control on the downgrade is available through rheostatic dynamic braking. The braking control permits as many points for dynamic braking over a full range of speed and braking effort as for acceleration, thus permitting the operator to handle the heavy load easily and without use of the mechanical brakes except when he may wish to retard speed just before entering a sharp curve.

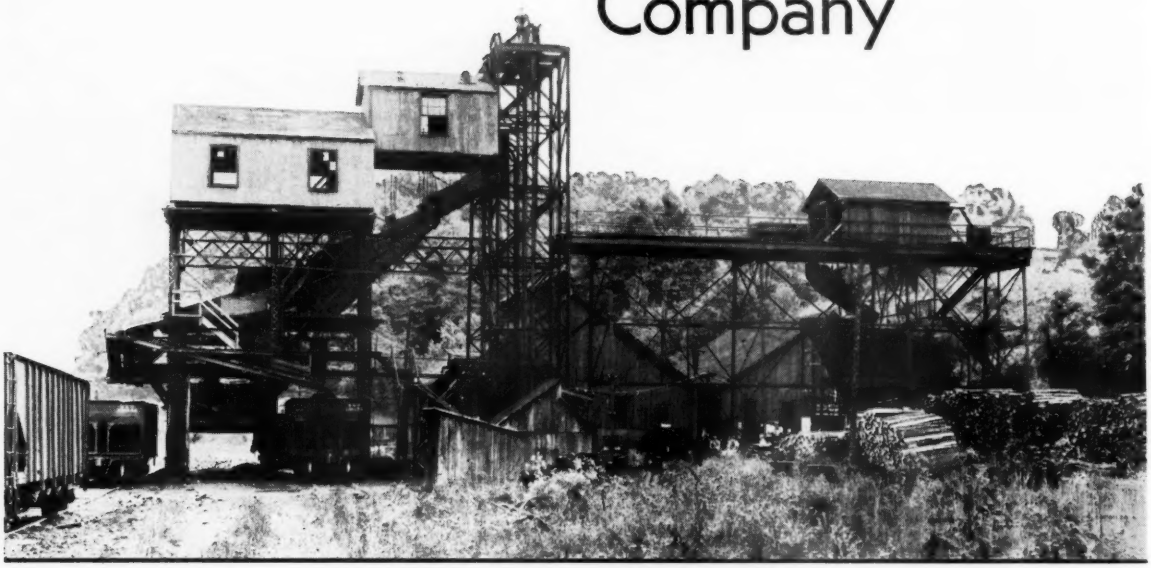
Gold Mine Trucks Ore

The Pine Hill mine located near Wolf, Calif., and operated by Bert C. Austin and Company of San Francisco, recently was placed in operation with the beginning of ore trucking to the Stockton Hill mill, a distance of eight miles.

Old Ben Sinking Shaft

The Dravo Construction Corporation of Pittsburgh, Pa., is sinking a new shaft described by the Old Ben Coal Company as an air shaft or auxiliary shaft, at the Old Ben Mine No. 9 in Illinois. Since this mine has been closed since 1927, the start of the work has led to speculation that the mine may be reopened.

SHAKER CONVEYOR MINING at the Century Coal Company



Tipple of Century Coal Co., in Barbour County, W. Va.

By JOHN L. ORR
Superintendent
Century Coal Company

A remarkable production has been attained at the Century Mine of the Century Coal Company, located in Barbour County, W. Va., with shaker conveyors equipped with automatic self-loading duckbills.

The Century Coal Company is owned by the Shaw family, and has been operated by them continuously since 1900, a very good record. At the present time it is under the management of J. K. Shaw, Jr., vice president, who, in the latter part of 1940, decided to mechanize the mine. His decision was made to use Goodman shaker conveyors, equipped with automatic duckbills, thus keeping in step with the present trend of mechanized mining.

The general office of this company is located in Baltimore, Md. John Orr, the superintendent, is in charge at the mine, and he has worked out the plans of operation all of which have proved to be advantageous. He has had many years of experience with conveyor mining both in the West and in the East.

The Century Coal Company's mine is located in the Red Stone seam, which lies between the Pittsburgh and the Sewickley seams. The terrain of the country is very rolling, and due to the hills and hollows, the overburden varies from 15 ft. to 350 ft. in thickness. The main overburden consists of a laminated sandstone. The coal measure is 66 in. in thickness, with very close face cleats and bedding planes. The coal in itself is of a friable nature. Directly over the coal is a shale, which ranges from 1 in. to 30 in. in thickness, and over the shale is the sandstone. This sandstone is comparatively strong. Immediately below the coal is a hard fire-clay bottom. At times there are clay seams which cut through the coal seam; when these occur, the roof condition gets a little on the "bad" side, but, all in all, the average roof is fairly good.

Mine Has Automatic Hoisting

The coal seam is reached by a two-compartment shaft, 155 ft. deep, with one compartment for air and the other for hoisting. Cages are of the automatic, self-dumping type. Cars are hoisted on the cages by a 200 hp. automatic hoist, which is being changed over from steam to electric drive. It is remotely controlled. The hoisting apparatus is located at the tipple, near the dump. Two dumps per minute can be made, and the cars hold two tons of coal, loaded by conveyors.

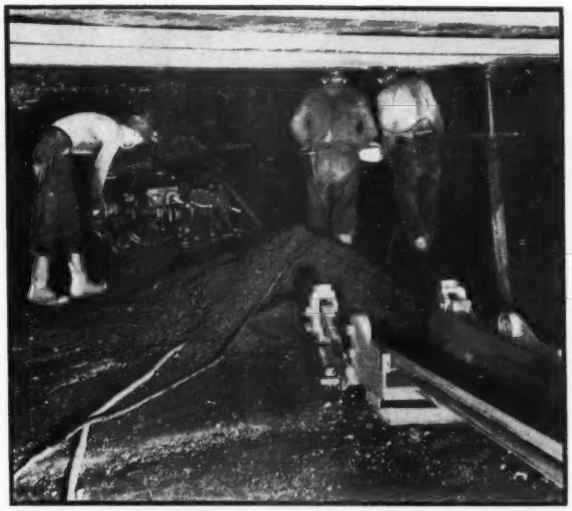
The coal is hauled to the shaft bottom from the conveyor sections by electric trolley locomotives. The haulage roads are laid with 60-lb. rails. The length of the haulage from the conveyor sections to the bottom is approximately 1½ miles, and 35 cars are hauled per trip. The cars are of

wooden construction, and are equipped with roller bearing wheels.

The electric power is purchased, 220 volts, a-c, 3 phase, 60 cycle. This power is led into rotary convertors, which generate 250 volts d-c, and which supply the current for the mine. The power is taken to the bottom of the shaft with a 1,000,000 C. M. line; from there it is led to the conveyor sections, with five 4/0 cables. The return to the bottom is through two 60-lb. rails, bonded and cross-bonded every 100 ft.

Loading Units Can Be Supplied With Cars, Without Stops for Car Changing

The track is laid in two entries, as shown in Figure 1. This permits a locomotive to service these units without stopping the latter for car changing. The track is carried on as the entries advance beyond the loading point, a track being laid through the cross-cut at the loading point. On the outside rail in each entry the track is continued without breaking. The inbye rail on the curve is formed to be used at each set-up, leading from the outside rail on the straight track; on this curve a latch point is placed. This latch point permits carrying the outside rail forward with the track work. The outbye rail on the curve is also formed so as to fit the inside rail on the straight track. On this inside rail, where the curve leaves the straight track, a rail for the straight track is omitted, and is left along side of the track at the curve. This rail is measured to exact length, to fit in the space when the curve is taken up and advanced.



Shortwall machine cutting while Duckbill crew commence drilling

Development is by Three Entry System

Development work is laid out on a three entry system. The entries are driven 20 ft. wide, with Type G-20 B70 Goodman shaker conveyors equipped with automatic duckbills, and the coal is cut with a Goodman 112 Universal control shortwall, equipped with 8½ ft. cutter bar. The room entries are driven up a distance of 1,200 ft. to a pre-determined line. The rooms are worked on the retreat. All cross-cuts and room necks are driven on a 45 degree angle, and this system permits the duckbills to load readily all of the coal. Two cuts are taken from the room necks as the entries advance. Cross-cuts are driven on a chain pillar, on 80 ft. centers; cross-cuts on the room side are driven on 33 ft. centers, to allow for a cross-cut opposite each room neck. The entries are driven on each conveyor set-up, a distance of 325 ft. When the shakers are moved to an advance set-up, they are only moved up a distance of 270 ft., leaving a distance of 55 ft. from the new set-up to the face. In this distance the duckbill can be put on at the beginning and immediately start loading coal.

In developing the entries, room necks and cross-cuts, three to four cuts are taken out on each shift, each cut making approximately 35 tons to the fall. A four-man crew is employed at the face on each conveyor unit.

Sequence of Face Operations Speeds Mining

The operation at the face is as follows: First, the face is undercut, the

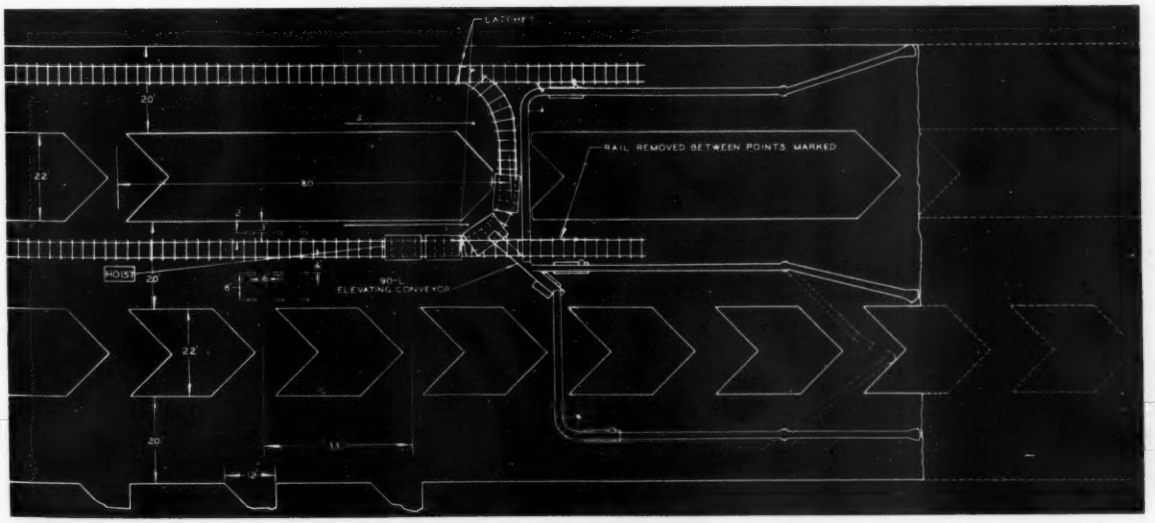


Figure 1. Three-entry plan of mine. Entries driven on butts

whole width of the face. Then the cutting machine is pulled back to the right hand rib, to a distance of about 12 ft. from the face, and the face is drilled, with electric hand-held drills. Six holes are required, each to a depth of 8 ft. to the back of the cut. After the holes are drilled, the two bottom holes are loaded and shot, as shown in Figure 2. These two holes are the snubbing shots, and are loaded with two sticks of powder each. The coal from these two shots is then loaded out by the duckbill. Next, the two top center holes are loaded and shot. Here, the No. 3 hole is loaded with two sticks of powder and the No. 4 hole is loaded with three sticks; they are then fired. Finally the two rib holes are loaded with five sticks each, and shot. The powder is of permissible type sticks, 6 in. by 1¼ in. In this connection, Mr. Orr "pulled one of his tricks out of the bag," and had a neighboring company, which manufactures brick, make up stemming. This stemming is 1¼ in. in diameter by 12 in. long, and is made out of the same material as the bricks. This is delivered to the mine in boxes, and the 12-in. sticks can then be broken into whatever length is desired. This form of stemming, made at the brickyard, is very convenient to handle, as it requires no paper bags or making up of so-called "dummies," and saves considerable time.

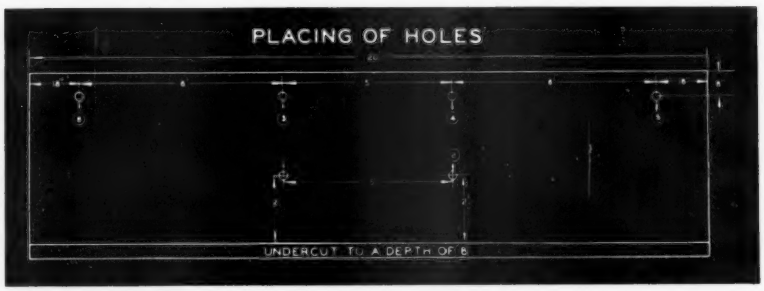


Figure 2. Shooting diagram

The coal from the snubbing shots is loaded out first, to insure the maximum amount of lump coal. Then after the place has been cleaned up with the duckbill, the mining machine is again pulled into position, sumped, and the place is cut again, thus completing the cycle of operation.

The duties of the four men employed at the face are as follows: While two men are doing the cutting with the mining machine, the other two men are taking in the supplies, troughs, timbers, ball frames, powder, etc.; and these two men also make up the powder. The two machine men also do the drilling. After the place is shot, the two men who have been doing the supplying, operate the duckbill and load out the place. While these two men are loading the fall of coal, the two machine men drop back and change bits in the cutter chain, if necessary, put up the timber, extend the trough line, and get what supplies are needed. With this cycle of operation for the four-man face crew, a supply man, for that purpose only as is customarily used on many installations, is not necessary.

No. 1 hole—2 sticks
No. 2 hole—2 sticks
No. 3 hole—2 sticks
No. 4 hole—3 sticks
No. 5 hole—5 sticks
No. 6 hole—5 sticks
Total of 19 sticks

Duckbill and Shaker Conveyor Employed in Each Entry While Driving Entries

In driving the three entries cross-cuts are driven on 80 ft. centers between the center and left hand entry. Between the center entry and the right hand entry, cross-cuts are driven on 33 ft. centers. Three rows of props are carried in each entry, carried on

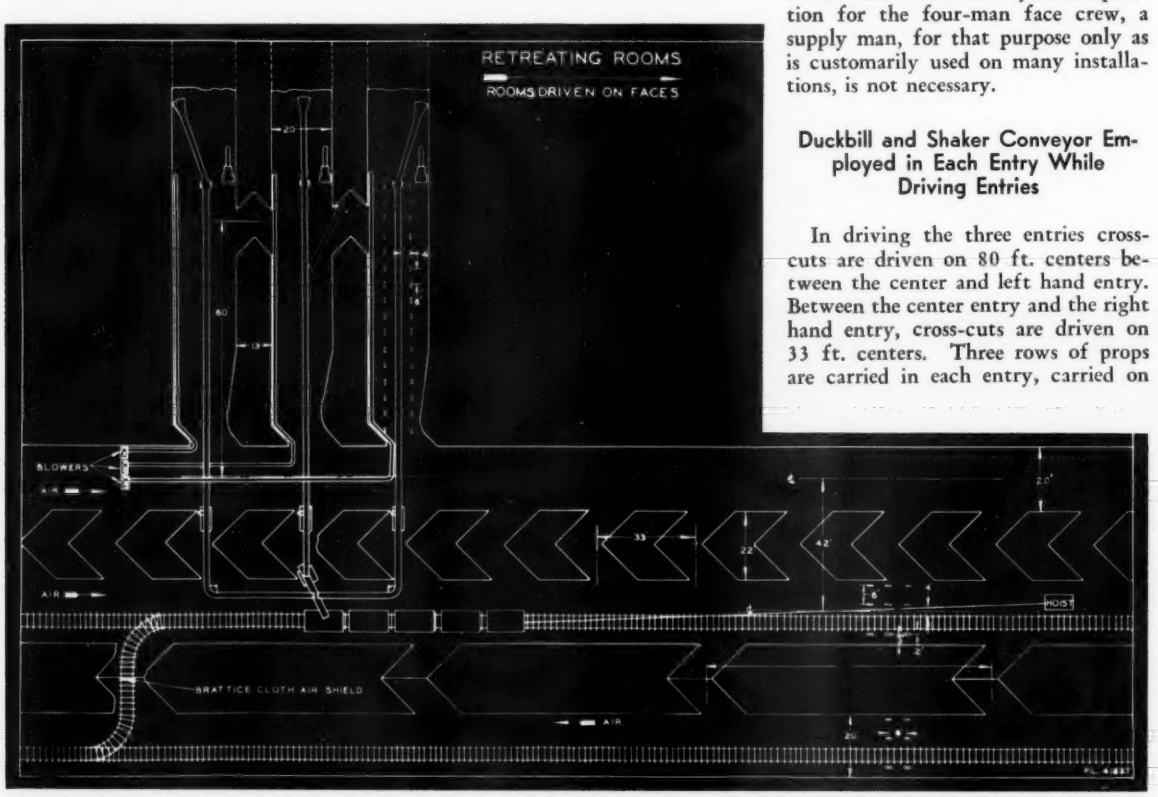


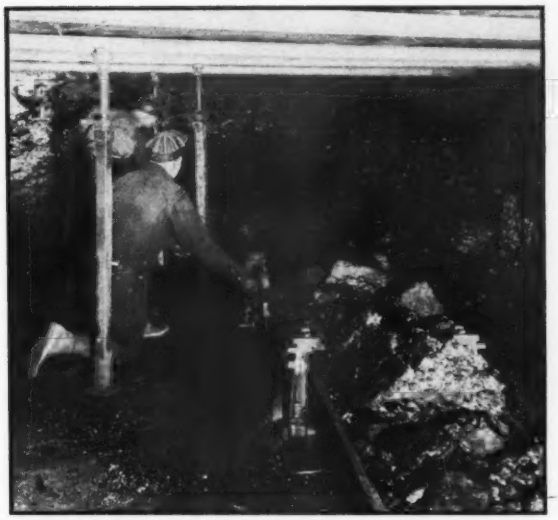
Figure 3. Face and entry lay-out, showing track arrangement for car change at loading point

6 ft. centers. The coal is loaded on the center entry. On the two outside entries a 90 degree angle trough is employed, to bring the coal from the two outside entries to the center entry. On the center entry a 90-L Goodman elevating conveyor is placed at the loading point. All three shaker conveyors discharge into this elevating conveyor, which, in turn, discharges into the cars. A train of 35 cars is supplied to each unit, the cars being pulled under the elevating conveyor by a small electrical hoist. This hoist is set far enough on the outbye side so that the 35 cars may be loaded in one train.

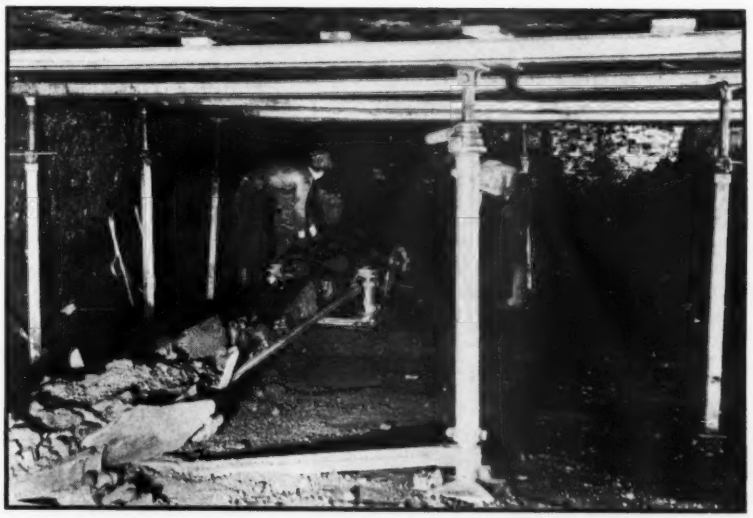
Track Layout for Loading Entry Work is Carefully Planned

The track lay-out and the supplying of empty cars in the development work, when driving entries, is a little different from that when the rooms are being retreated. In the case of driving on the advance with the entries, the empty cars are pushed ahead of the locomotive to the loading point, and when retreating with the room, the cars are pulled inbye the loading point, and pushed through the crosscut to the loading point. (See Figure 3.)

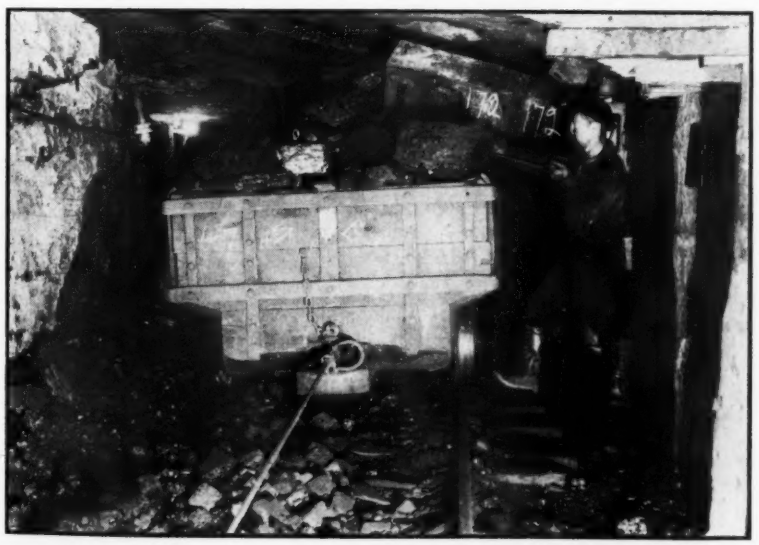
After the three entries have been driven up a distance of 1,200 ft. to a pre-determined line, the rooms, 20 ft. wide and driven 300 ft. deep, are then worked on the retreat. Three rooms are worked abreast, simultaneously, and are driven on the face of the coal. The shaker set-ups for the two outside rooms employ 90 degree angle troughs to turn the flow of the coal into the elevating conveyor. These two outside conveyors discharge over the side of the elevating conveyor, while the shaker conveyor in the center room discharges into the hopper end of the elevator.



Duckbill loading fresh fall of coal



Below: Beginning to load from left-hand rib

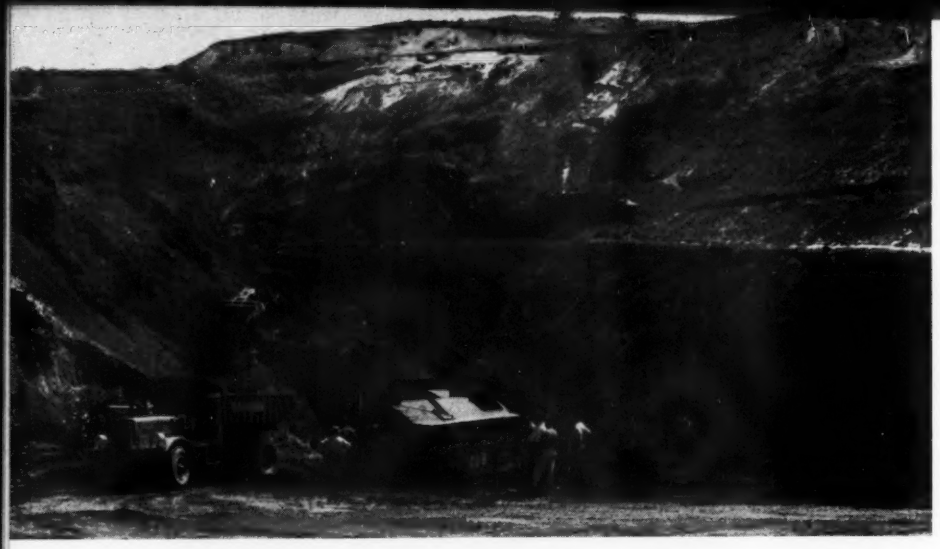


Left: Discharge end of elevating conveyor

The elevating conveyor is at approximately 45 degrees from the center line of the entry; this angle facilitates ease of movement when transferring to a new set-up, as a locomotive can move it from this position with very little trouble.

In using the three-entry system, it will be noted that the drives of the shaker conveyors are placed in the

(*Continued on page 56*)



Getting out the ore with trucks equipped with fluid drive; mine on the Mesabi Range

Fluid Drive For Mining Machinery

By JOHN D. ROSEBROUGH
Engineer
American Blower Corp.

The hydraulic coupling principle has received wide attention through its increasing use on automobiles. A less publicized but equally important field of application is as a drive coupling for mining machinery, which subject is discussed here by Mr. Rosebrough.

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ALTHOUGH commonly associated with automobiles, the fluid coupling has a wide variety of uses and has many advantages beside those apparent in the passenger car. For industrial machinery it is quite common as a power transmission device in sizes from 5 hp. to 3,000 hp. In mining equipment the fluid coupling reduces maintenance and provides a stepless variable speed drive when used with a simple general purpose a-c motor. Good results in current saving, and motor and machinery protection are achieved using a shunt wound d-c motor with a fluid coupling where d-c series motors are now commonly used.

Fluid Drive Transmits Power by Turbine Action

The fluid coupling is a hydro-kinetic transmission—it transmits power by turbine action. The impeller or primary rotor pumps oil by centrifugal force into the runner at the outer rim. (The arrows in Figures 1 and 2 show the path of the oil.) The oil strikes the runner and flows inwardly to the center of the vortex where it returns to the impeller.

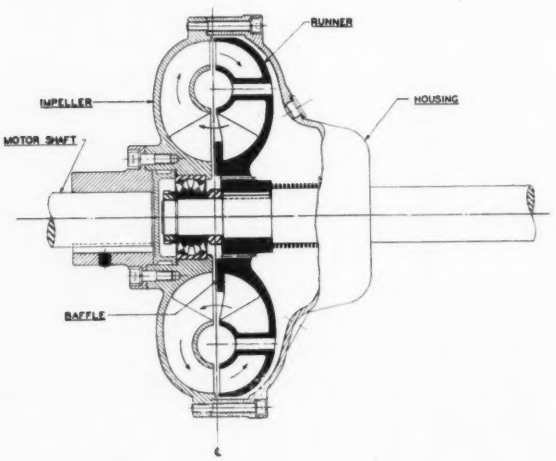


Figure 1. Cut-away, showing fluid-drive principle

The impeller always runs slightly faster than the runner so that the oil strikes the runner at an angle at high velocity and thus drives it by turbine action. Since the vanes are straight and the two halves identical, the fluid coupling may run in either direction and either element may be the driver. The efficiency of power transmission is in the order of 98 percent, at rated power and maximum speed.

There are two types of industrial fluid drives—the traction type commonly used in automotive drives and the variable speed fluid coupling. The traction type unit is most simple, containing only two primary rotating elements in an enclosing rotating housing (see Figure 1); it has a constant filling of oil and is intended primarily for shock elimination and the protection of motors and machinery from overload.

With Traction Coupling Motor Always Starts Unloaded

The principal gains to the mine operator in the use of both types of hydraulic coupling is the simplification of starting equipment, reduced maintenance and reduction of fire hazard by elimination of exposed sparking electrical equipment.

With a traction coupling a motor always starts unloaded; practically no power is transmitted until the motor

nears top speed where it develops back EMF and thus uses low current. (See Figure 5.) Since the motor rotor will always accelerate rapidly, starting is a simple problem—just like starting a centrifugal pump. Across-the-line starting may be used with a-c motors and only a few taps with d-c motors. Miners find it hard to do damage to motors because it is impossible to stall the motor and arrive at locked rotor current; the fluid coupling stalls first, giving a longer time before overload relays must trip. A further distinct advantage is the lack of mechanical connection between impeller and runner. If the machinery jams for some reason, the flywheel effect of the motor armature cannot deliver a knockout blow. Much of the inertia of moving parts is stored in the motor because it may be running at 10 to 20 times the r.p.m. of the chain sprocket, and as inertia varies as the square of the speed ratio the effect is 100 to 400 times the inertia of the sprocket.

When a piece of machinery is overmotored as a safety precaution, the motor torque can be cut down by changing the oil filling of the fluid coupling to suit actual requirements. This characteristic of the coupling is shown in figure 4.

When a direct coupled a-c motor is stalled under load the current rises to 5 or 6 times normal and heating to 25 or 30 times normal, while the cooling is reduced to one-fourth due to poor ventilation of windings at locked rotor condition. The fluid coupling keeps current to twice normal and heating will be only four times normal while still applying maximum permitted torque to the equipment. If the jam is not cleared in a reasonable time, a delayed action overload trip must then operate.

The fluid coupling can operate in dust-laden atmospheres without damage. It allows the use of the rugged squirrel cage motor on many drives previously using d-c and slip ring a-c motors. Where d-c is the most practical current, a shunt wound motor can be used with a fluid coupling with excellent results.

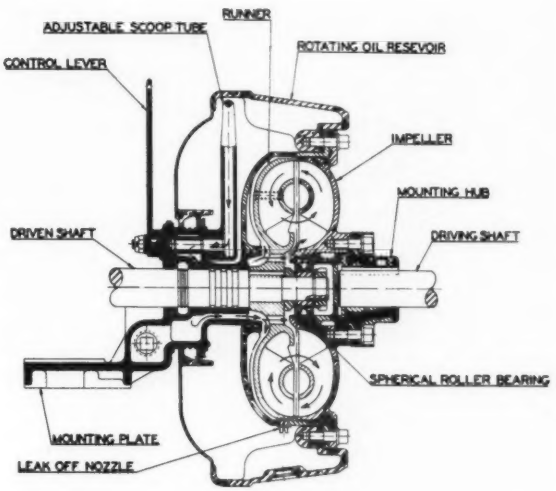


Figure 2. Variable speed coupling unit

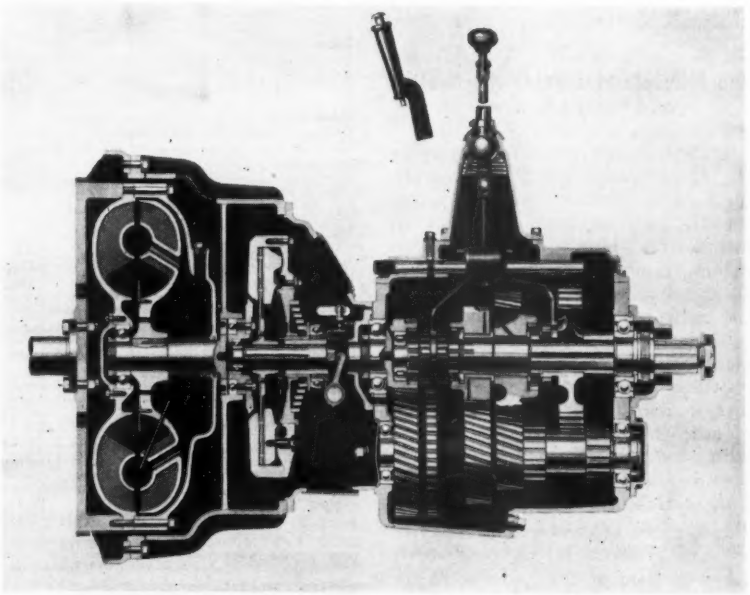
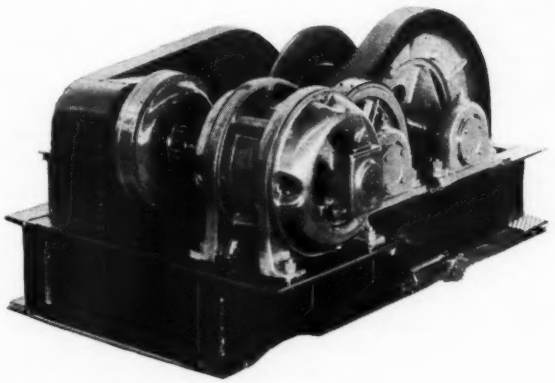


Figure 3. Fluid coupling in connection with heavy-duty truck transmission



Barge puller winch with fluid coupling drive

Variable Speed Unit Adds Versatility

One style of the variable speed unit introduces an additional rotating housing with an adjustable scoop tube to regulate the flow of oil while the unit is running. Changing the quantity of oil in the vortex between runner and impeller causes changes in speed of the runner shaft; taking oil out decreases speed, and adding oil increases the

speed. Figure 2 shows a cross-section of the variable speed unit. A rotating oil reservoir which is bolted to and rotates with the impeller contains oil not in use; the oil lies in a belt against the outer rim, held there by centrifugal force. To increase speed the eccentric scoop is revolved until its tip is in the oil belt where it scoops the oil up and forces it into the working circuit between impeller and runner. To decrease speed the scoop is retracted and the oil flows out of the working circuit through calibrated nozzles. Thus a constant speed a-c motor can be converted to a variable speed drive with utmost simplicity. An external lever controls the scoop and therefore the speed.

In addition to the other advantages of the fluid coupling, the scoop control design provides a rapid control of rate of acceleration, a stepless control of speed, and a positive means of disconnecting the load from the driver. Remote control of speed and automatic control is easily applied.

The Principle Has Wide Application on Mining Machinery

Machines used in mining employing the fluid coupling are conveyors, mechanical loaders, hoists, haulage trucks, rock crusher, scraper hoists, locomotives, bucket elevators, trip-making machines, power-driven shovels and draglines, ventilating fans and rod mills; also variable speed control of induced draft fans in the power plant regulating steam output by draft control. In addition to these present uses, it seems probable that experience in other fields will lead to their use on most d-c driven machinery to prevent damage to motors from poor machine operation.

In the case of conveyor drives there are two problems which arise—first, the prevention of overload due to ore or coal being caught in the drive and, secondly, the distribution of load on multimotored conveyors. It has been found that shear pin breakage can be eliminated by the fluid coupling since it acts as overload protection for the drive by limiting the motor torque to a safe value and preventing the flywheel effect of the armature from delivering a punch press-like blow to the drive on sudden overload. On the next page is shown a conveyor drive in which shear pin breakages due to impact were occurring at the rate of three to six per day. In a year's operation after installing the fluid coupling there have been none. The question of balancing the load between motors

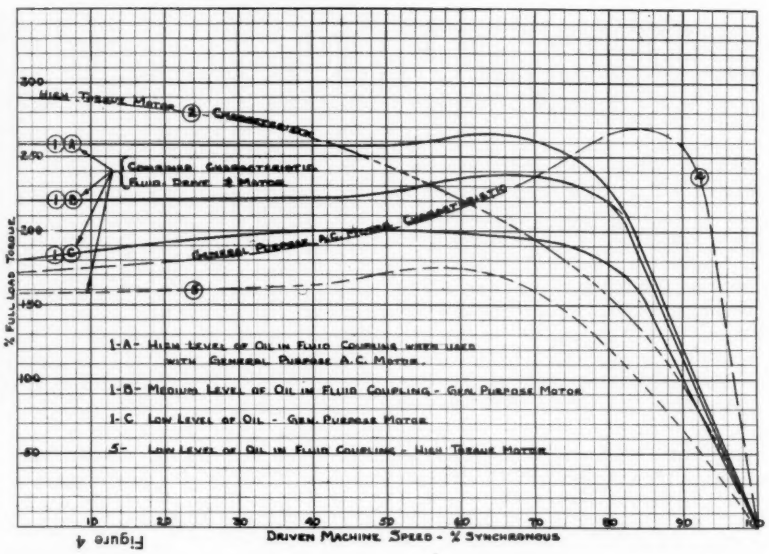

% Full Load Torque
Driven Machine Speed - % Synchronous
1-A- High level of oil in fluid coupling when used with General Purpose A.C. Motor.
1-B- Medium level of oil in fluid coupling - Gen. Purpose Motor
1-C Low level of oil - Gen. Purpose Motor
5- Low level of oil in fluid coupling - High Torque Motor

Figure 4

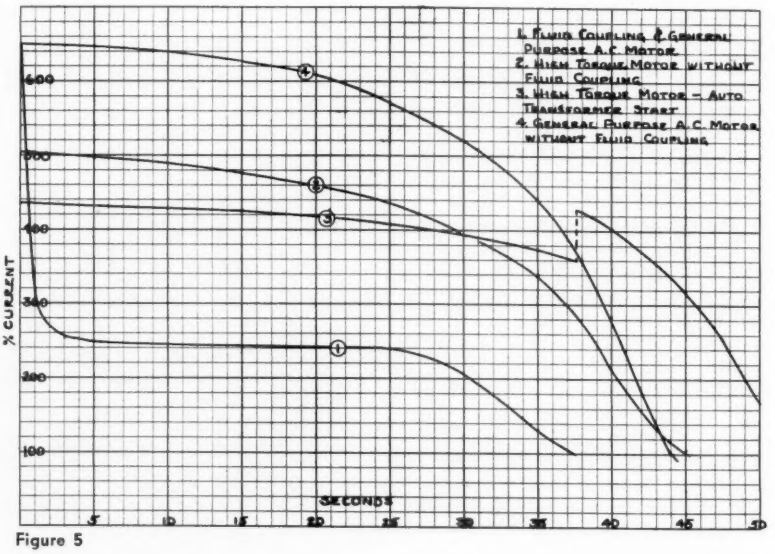

% Current
Seconds
1. Fluid Coupling & General Purpose A.C. Motor
2. High Torque Motor without Fluid Coupling
3. High Torque Motor - Auto Transformer Start
4. General Purpose A.C. Motor without Fluid Coupling

Figure 5

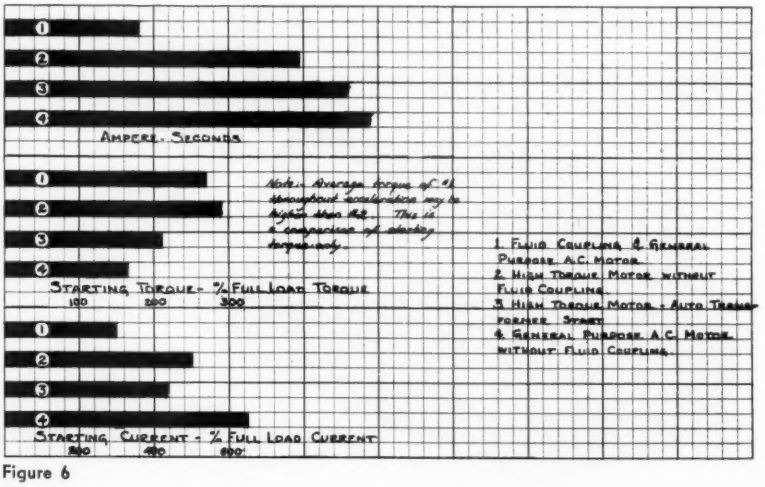

Ampere - Seconds
Starting Torque - % Full Load Torque
Starting Current - % Full Load Current
1. Fluid Coupling & General Purpose A.C. Motor
2. High Torque Motor without Fluid Coupling
3. High Torque Motor - Auto Transformer Start
4. General Purpose A.C. Motor without Fluid Coupling

Figure 6

on a long conveyor has been a serious one. Experience in automobile plants proved that the fluid coupling equalizes the load on each motor, reducing the motor sizes needed. Any excess load on one unit causes it to slip, forcing the other motors to take up the slack in the belt or chain.

At a copper mine in upper Michigan, a rod mill is driven by a 600 hp. Deisel and 48-in. fluid coupling. This type of drive opens up new possibilities in the use of portable power. A fluid driven underground mine locomotive, to operate in explosive atmosphere and powered by an internal combustion engine, is a further step in this direction.

One user of a trip-making machine installed a fluid coupling to solve the problem of broken shear pins and gear shafts caused by a loaded car striking a string of empty cars as it reached the tipple. At times the switching locomotive bumped the string of empty cars, further jolting the drive and reversing it.

Experience has shown that blockage of hard coal in jigger feeders has caused breakage of worm reduction gear box shafts and housings; and, in order to overcome this, fluid couplings have been installed in existing machinery designed to stall at 1.9 times full load torque.

An aerial ropeway in India has the power units (an electric motor and a Diesel) located some 12 miles apart and it is important to limit the torque that can be transmitted by either one, particularly if there is a time lag in starting up. It is probable that the Diesel engine would be unable to start the ropeway by itself. In addition, a small auxiliary drive to keep the rope taut and spread the loading employs a fluid coupling.

The reversing duty required by the skip hoist in loading, discharging, and returning has prompted the use of fluid drive to reduce motor heating and smooth out starting. In the case of loaders, increased flexibility has encouraged its use with electric motors to duplicate air motor performance.

Fluid Coupling Has Advantages on Fan Drives

Where increased ventilation air must be supplied as the mine is developed, it is of great advantage to maintain an even flow of air in each section, increasing the total air flow with each new drift. The power saving resulting from variable speed control is considerable, usually paying for the variable speed feature in several years. Such a high return on the investment has led to the use of variable speed fluid couplings on mine fans. Either automatic or remote manual control is applied.

Fluid coupling in this conveyor drive eliminated shear pin breakage

Fluid Drives for Heavy Duty Trucks

In the Mesabi Range two large operators have a fleet of trucks with a gross vehicle weight of 62,000 pounds each which travel as fast as 24 miles per hour on the level. On a 15 percent grade, with the main transmission in second and the auxiliary in low, they run five miles per hour. This tremendous weight formerly required a mechanical transmission with many steps to get it in motion, but it was soon discovered that the fluid coupling made unnecessary the transmission shifts. The truck can be started from a dead stop in the correct gear ratio for running just as a pleasure car can be started in high with fluid drive. It is impossible to kill the engine due to starting in too high a gear. The largest load pulled was an 80-ton trailer with a gross weight of 220,000 lb. This colossus was described in more detail in a paper presented by the Hume-Sinclair Coal Company at the American Mining Congress meeting in 1939. It has been demonstrated many times that a standing start in a higher gear results in faster take-off than shifting and punishing the lower ratios to get moving, because the time lost in shifting is too great.

Friction clutches are also used in this transmission. They are air operated in most cases and are either "in" or "out" since all slip and starting acceleration is governed by the fluid coupling.

At Bauxite, Arkansas, fluid drive locomotives are being used in hauling ore cars. The fluid coupling in the mechanical locomotives was found to increase tractive effort and generally smooth out spotting and loading operations. It approached steam and Diesel-electric performance with the simplicity of construction and operation of the Diesel-mechanical drive.

Power shovels show a distinct improvement with fluid drive. In one case where three shovels were working side by side in rock, it was significant that in the two without fluid drive the engines fired backwards, causing considerable damage and lost time, while the one shovel with a fluid coupling experienced no trouble. Peculiarities of operation appear, such as the ability to nose under a large rock and joggle back and forth with the throttle without touching the clutches and with no danger of stalling the engine.

On Tumbler Drives Fluid Couplings Lessen Dredge Breakdowns

In remote parts of Malay, where replacement parts must be flown in, gold and tin dredge operators have found that costly shutdowns can be avoided by the transmission of power to the bucket line, winches, sand pumps and screens through fluid couplings. It is significant that every tin dredge built in Holland the year before the war was equipped with a variable speed hydraulic coupling on the main tumbler drive. To date there are 19 of these immense floating process plants so equipped.

The main tumbler drive presents

the most difficult problem. Power required is in the neighborhood of 350 hp. with a variation in bucket line speed of 15 percent. The type of hydraulic coupling selected for this application is a heavy duty unit with a cast iron tank base in which excess oil is stored. A small motor-driven control pump is provided with reversing switch to add or remove oil from the rotating parts. A remote push button allows control from the operating room. During bucket line repairs the hydraulic coupling is partially filled and a brake on the output shaft momentarily released permits the buckets to inch along to the correct position. The drive will also operate in reverse in case of a bucket caught on a rock at the bottom.

Sand suckers with a cutter head use the hydraulic coupling as a means of controlling pump output without overloading the driving motor. When the pipe line is short the pump is operated at reduced speed, and as the line is lengthened the pump is speeded up to overcome increased pipe line friction. Where a rock is picked up and sucked into the pipe line the hydraulic coupling isolates the inertia of the motor rotor or flywheel of engine from pump and thus assists in absorbing the impact as the rock strikes the pump impeller. The operator usually has some warning so that he can cut out the motor and start to drain oil from the fluid circuit. Where a Diesel engine propels the pump, a traction or marine type coupling is used.

Winches present the best example of the flexibility provided by the fluid circuit. Either a general purpose motor or a slip-ring motor is used with a fluid coupling. When the dredge is being swung from side to side in the channel by the mooring winches the bucket line (or cutter-head) may strike harder digging and necessarily slow up the travel sideways. The fluid coupling then pulls steadily, moving the dredge as fast as the bucket-line can work its way across channel; extremely hard digging may even stall the drive, but not the motor. On page 31 is shown a barge puller winch used for handling sand and gravel barges.

Rough waters force the winch to reverse momentarily as the barge rolls away from the dock. Where cables formerly were snapped by this duty, the fluid coupling stalls and reverses without damage to the motor which continues to run near top speed and at a safe current value.

In refining and smelting of metals, coking, and other processes following mining, engineers have applied the shock-absorbing principle and variable speed to ball mills, rod mills, centrifuging, draft control of ovens and variable speed control of kilns and agitator drives.

Although the fluid-coupling has been in use only 10 years for industrial processes, there are today upwards of 2,000,000 hp. being transmitted by them in this field. A wide variety of mining machinery has employed fluid drive, each new applicaton revealing certain advantages. With correct selection and mounting arrangement the installation on new and existing machinery is quite practical and with industry asking for 100 percent availability of machine time the fluid coupling offers another means of increasing production and decreasing maintenance.

Excavator and truck, equipped with fluid couplings, are protected against overload

Changes In Political Control of World Minerals

At a meeting of the British Columbia Division of the Canadian Institute of Mining and Metallurgy in October, the Hon. W. J. Asselstine, minister of mines for the Province of British Columbia, discussed the changes in the political control of world mineral resources brought about by the war. He pointed out that had Germany not been able to acquire additional raw materials through conquest, the end of the war would probably now be in sight, but that her position is so improved in that regard that the rest of the world must now exert every effort toward producing supplies and maintaining an increasing production for a long struggle.

He also said that at the beginning of the war the British Empire and the United States controlled about 75 percent of the world's output of minerals and fuels. On a weighted basis, taking into consideration the wartime importance of minerals and fuels, the British Empire and the United States within their political boundaries accounted for over half of the world's output and Germany has accounted for about 10 percent. The conquest of Europe has changed the picture materially. Germany on a weighted basis in valuing production, now produces about 20 percent of the world's output or an amount almost equal to that produced within the boundaries of the British Empire. She has increased her production of coal until it now is probably greater than that of the United States, formerly the world's record producer. She is still only a small producer of petroleum, but through the conquest of Rumania her position has been strengthened greatly, for Rumanian production accounts for some two-thirds of her total output.

In regard to iron, Germany before the outbreak of the war was a large importer and depended upon France and Sweden for iron ore. The conquest of Norway and France has made available to Germany all the raw materials she needs and at the same time has cut off from the United Kingdom important sources of iron and pig iron. She now has abundant sources of iron ore.

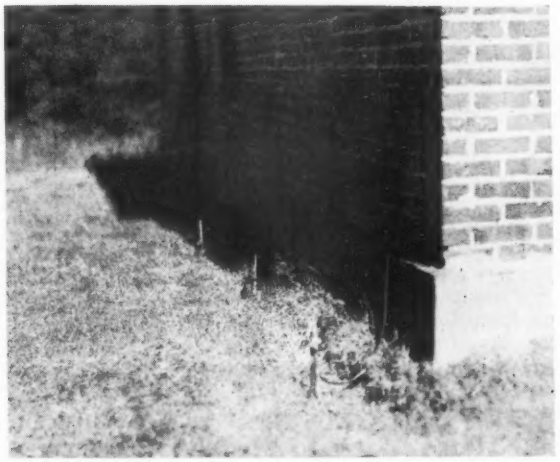
In regard to ferro-alloys Germany's position has not improved materially until lately, when through the conquest of a large part of the Ukraine she acquired about one-third of the Russian output of manganese. If Germany is able to divert this material to her own use she will have sufficient to maintain her steel industry. The situation with regard to copper is obscure, but since Germany is replacing copper with aluminum to a great extent, she is easing her position in that regard. For a while Germany led the world in her production of aluminum but it is now becoming evident that the United States is in a position to outstrip her and that the British Empire is running a close second. However, Germany has ample aluminum raw material and reduction facilities, except for those that are destroyed by bombing.

Practical Lightning Protection at Mine Sub-Stations

By C. C. BALLARD
Master Mechanic
The New River Co.

An interruption to mine electrical service, such as a stroke of lightning may cause, can be very expensive not only in damage to equipment but in loss of operating time while repairs are made. It pays to install adequate lightning protection, and maintain it in good working order, as Mr. Ballard points out in this article.

AS the mines of the company in the New River, W. Va., mining district are located some 2,000 to 3,000 feet above sea level, lightning storms are frequent and severe, and good lightning protection is needed to avoid damage to electrical equipment. In installing such lightning protection we have found that the stony character of the terrain makes it very difficult to install electrical grounds which will continue to maintain the necessary contact with the earth. Yet this is one of the most important points of any lightning protection equipment for, regardless of how well the manufacturers build, the machinery is exposed to serious damage without a ground properly maintained. After several years of experience and experimentation, during which time we have had our share of troubles in this regard, I have found that the method described below gives very good results indeed on motor generator sets, rotary convertors and other rotating equipment.



Grounds and ground leads at substation, properly installed

Figure 1

Good Ground Connection is Important

In order to obtain a good ground at the substations, six ground rods 6½ ft. long were driven down directly under the eaves of the building, so that the embedded rods would get the benefit of rain water dripping from the roof. This serves to hold moisture in the ground around the rods, and they therefore obtain a much better contact with the earth. Figures 1 and 2 illustrate this installation. Figure 1 shows the series of rods with 4/0 copper wire clamped and soldered to them. The rods are placed 6 ft. apart in order to cover as wide an area as is convenient; all rods are connected in series, with 2/0 wire, and with method of connection as noted. Figure 2 is a close-up, showing in more detail the method of connection.

As our negative electrical lines are grounded, we also make a practice of carrying a 2/0 wire from the frame of all machines to the negative line and then to ground rods. On A.C. 3-phase lines that carry a guard line we also connect to this guard line, as it may have better contact with the earth than that which we are able to get near the substation.

Figure 2

It is important that ground connections should be closely inspected periodically, and that broken wire or corrosion around the joints or the rods be taken care of promptly. It is also most important that the ground contacts be kept in good condition; faulty contacts increase the resistance in the ground circuit to such an extent that the protective equipment will not function as effectively as it should.

We have also found it wise practice to put lightning arrestors on both the primary and secondary sides of transformer. Figure 3 is a transformer substation thus equipped.

Line Type Arrestors Should Also be Employed

It is well recognized that the lightning voltage which the major insulation of a machine must withstand is the peak voltage of the incoming surge, and that to prevent damage to the machine, the magnitude of this voltage must be limited to the strength of the major insulation. In addition to station arrestors to reduce the magnitude of impulse waves, a set of line type lightning arrestors should also be installed. These should be placed from 1,500 to 2,000 ft. from the substation on incoming and outgoing A.C. 3-phase lines, with all arrestors connected to a ground and with the resistance not exceeding 5 ohms.

Lightning arrestors will not give the best overall protection, because of the steepness of the incoming wave that follows the lightning. To correct this, a capacitor should be installed on the station bus as shown in figures 4 and 4A. This will serve to limit the steepness of what I call the follow-up wave from the lightning, to a degree that it will be rendered harmless to the machine windings if the latter are in fair operating condition.

One of our substations, containing five motor generator sets protected against lightning in the manner above described, stands about 20 feet away from an oak tree which was hit by a direct stroke of lightning in 1939, as shown in figure 5. Following the lightning stroke the station continued to operate without any damage whatever, and mine operations were not disturbed. At this same station about ten years ago, before this type of lightning equipment protection was installed, a locust tree about 50 feet away from the station was hit by a direct stroke of lightning. Considerable damage was done to the station; one armature of a generator, one stator

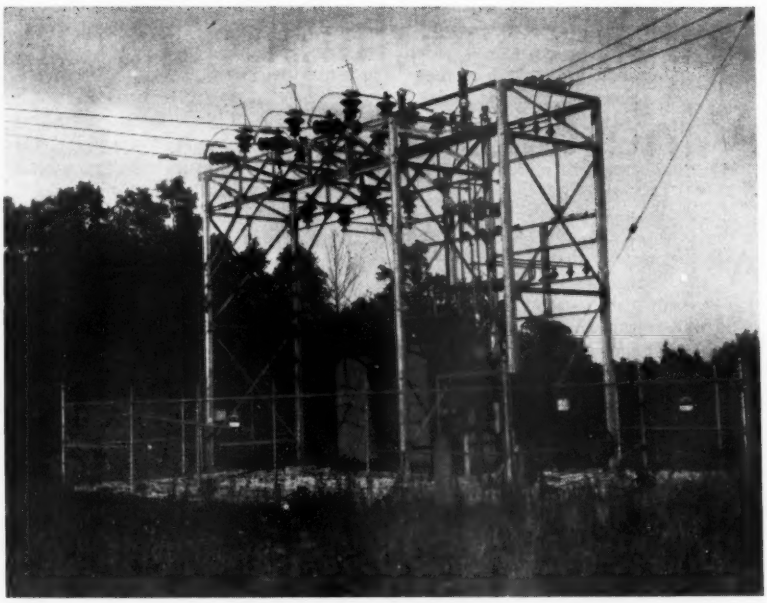


Figure 3. Transformer substation with lightning arrestors

Figure 4

Figure 4-A

Figure 5

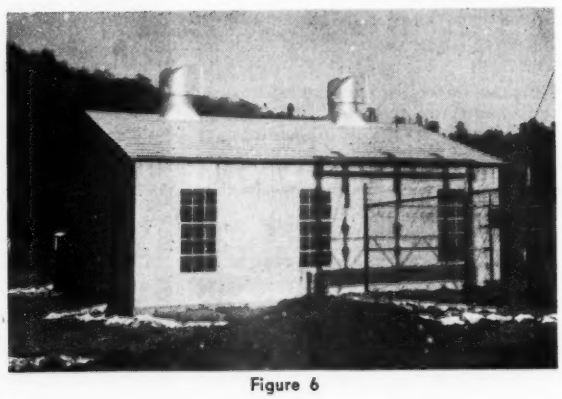


Figure 6

of a motor, and considerable switchboard wiring was destroyed, causing a loss of several hours of operation of the mine. At another substation where two 300 k.w. motor generator sets are installed, protected against lightning in this approved fashion, lightning made a direct hit several years ago on the A.C. 3-phase line, about 2,500 feet from the station. The stroke damaged three line poles to such an extent that one had to be replaced. The station received no damage whatever and there was no interruption of service to the mine.

After several years of experience with the old type of lightning protection and seeing the damage that was done, I know that improved lightning protection devices such as we have installed, provide a reasonable amount of protection and insurance, if care is taken in installing and maintenance after installation. It must be borne in mind, however, that vigilance must be exercised to see that the installations are kept in good operating condition. The most modern type of lightning protection equipment will not be of value if the ground wires are corroded, if too small a connecting wire is used with a high resistance, or if the ground contact is not properly maintained. Only periodic and systematic inspection and tests will keep lightning protection equipment in good working order; otherwise the protective devices are useless.

PERFORMANCE RECORDS FOR WIRE ROPE

WITH the increasing use of machines in mining, mineral production has grown more and more dependent upon the continuous performance of equipment and the problem of maintenance has become one of major importance. Restrictions of governmental priorities on equipment are also emphasizing the necessity of getting the longest and fullest use possible out of each piece of equipment. Many companies now recognize that money spent to prevent breakdowns and replacements is returned several times through savings in the operating cost. Selection of the proper type of equipment and supplies to give the best service under any given set of conditions requires study and investigation; generalizations or observations are not dependable, and service records are needed to find the answer. This applies not only to large machines but even to the so-called "minor" equipment, and particularly to wire rope which has many and varied uses in deep mining and strip pits, such as for hoisting, haulage on slopes and inclines, for coal cutting, and on steam and electric shovels.

There is, in truth, no such thing as a minor piece of equipment—more especially when such equipment is expendable material. No machine, however large or expensive, is better than the wire rope that operates it. A rope that breaks frequently, thereby throwing into unproductive idleness for hours or days not only the machine but men as well, is certainly no "minor" piece of equipment. It becomes a major expense—but one which cannot be intelligently corrected without detailed information regarding rope type, construction, grade of steel, whether preformed or non-preformed, size of sheaves or drums, conditions of treads, character of work, previous performance data, and other pertinent facts.

Wire rope is far more than merely something to reeve onto a machine to make it work. Wire rope is a machine of itself. An ordinary 6 x 19 rope (six strands of 19 wires each) is a machine with 114 working, moving parts—every one of which has been drawn to a high degree of mechanical precision. And there is a vast difference in wire ropes.

Most ropes may look alike but in actuality they are not alike. There are many different constructions, each designed for a particular purpose or to fill a specific need. Preformed rope gives longer and better service as a running rope but is ordinarily not needed for guy wires or standing ropes. In some work, such as cable tool drilling in the oil fields, non-preformed ropes have been found superior to preformed; whereas in rotary drilling, where the wire lines are merely hoist ropes, preformed has grown in high favor over non-preformed.

Since wire rope isn't just wire rope, and since wire ropes differ pronouncedly in character and service, it is only good management to maintain work records of every line installed. Such records kept up-to-date, and studied, have invariably become the means to more intelligent rope selection; which means better and longer rope life and reduced rope replacement costs as well as reduced machine shutdowns and steadier production.

Rope service record forms are not difficult to make. A mimeograph or multilith stencil, readily cut by any typist, will turn out a hundred in short order. The accompanying illustration is a reproduction of such a record form developed by the American Cable Division of the American Chain and Cable Co. It is complete in all essential details and provides space for the record keeping of three lines each of three-rope applications.

WIRE ROPE SERVICE RECORD

Equipment..... MAKE ..... MODEL OR CAPACITY

Condition of Sheaves and Drum.....

DESCRIPTION OF WIRE ROPES OR LINES

	SERVICE	LENGTH	DIA.	CONSTRUCTION	GRADE	BRAND
No. 1						
No. 2						
No. 3						

SERVICE RECORDS OF LINE NO. 1

BRAND..... DATE INSTALLED..... REMOVED.....

LUBRICATED (DATES).....

WORK DONE.....

BRAND..... DATE INSTALLED..... REMOVED.....

LUBRICATED (DATES).....

WORK DONE.....

BRAND..... DATE INSTALLED..... REMOVED.....

LUBRICATED (DATES).....

WORK DONE.....

SERVICE RECORDS OF LINE NO. 2

BRAND..... DATE INSTALLED..... REMOVED.....

DRAGLINE DREDGE METHODS AND EQUIPMENT

By HARRY S. LORD
Lord and Bishop
Sacramento, Calif.

The exploitation of placer deposits by means of dragline dredges has grown in the short space of seven years from an industry producing gold valued at $1,924 in 1933, to one producing a recovered value of over six million dollars in 1939. Mr. Lord gives some very interesting data on these "doodlebugs" and outlines the conditions under which they may be successfully employed.

IT is my privilege to discuss a comparatively new phase of gold production which, in the short period of nine years has grown from an experimental stage to an industry producing last year in excess of $8,000,000 worth of gold in California alone. I refer, of course, to the dragline dredges, the operation of which has increased so steadily in the last few years, particularly in California where the development of various types of dredging equipment has proved so important in recovering the gold from the State's far-flung placer deposits.

While California is the home of the dragline dredge, the use of this type of equipment is not limited to the west. Similar operations have been undertaken in North Carolina, South Carolina, Virginia and Georgia, but not to the extent or with the success experienced here.

Incidentally, the same glacial era that was responsible for California's placer deposits also left gold-bearing terrain in the north, particularly in British Columbia, Canada. Many operators today are looking in this direction as a locale for future development. To date these potential operations have been limited by high initial costs, some of which were reduced recently when the Canadian government removed the duty on placer gold recovery equipment.

Dragline Dredges are a Recent Development

To return to California, I would like to outline briefly the history of this comparatively new method of recovering gold. I am indebted to E. B. Howe of Oakdale for the information that Harp Brothers built a boat in Arizona in 1931-32. It required eight months to construct and was designed either to skid or float. It had a capacity of approximately 300 cu. yds. a day. It so happens that this rig was not seen by any California mining men and therefore played no part in the development of dragline dredge equipment in this State.

Our history, then, begins in Oroville about nine years ago when a home-made boat was constructed by the late Horace Onyett. It consisted of a perforated trommel 24 in. in diameter and about 12 ft. long. The maximum capacity, with a ½-yd. bucket, was 200 yds. per day. While this equipment was replete with mechanical defects, basically it followed the principles used today, even in the Dayton dredge which uses a 12-cu. yd. dragline and the washing plant has a capacity of 12,000 cu. yds. per day.

When Onyett first showed his contraption to some friends, one of them asked what kind of equipment it was. "I don't know," Onyett answered. "I guess it's a 'doodlebug'." As far as we know that was the origin of the catchy nickname which has since been used by the industry to designate this particular type of mining equipment.

Production from This Source Has Increased Steadily

As I have indicated, the number of dredges has increased steadily year by year. It is estimated that there are, at the present time, over 200 dragline dredges operating in California, and approximately 30 in the adjoining states of Oregon, Idaho, Nevada and Arizona. Specifically, the gold production from this source has increased from $1,924 in 1933 to $6,038,165 in 1939, according to figures compiled by Charles White Merrill, chief of the San Francisco office of the United States Bureau of Mines. Statistics for this period are shown in the table below.

This increase naturally gives rise to several problems insofar as the industry is concerned. It may be conservatively estimated that California draglines alone are handling about 300,000 cu. yds. a day, with a daily pay roll of over $6,000. As a result the number-one problem at the present time is to obtain sufficient placer ground to keep the present equipment busy, much less care for new equipment which might be contemplated. This is true especially of the less elaborate equipment as the values, of necessity, must be larger. It is possible, under favorable conditions, for the larger equipment to handle profitably ground in which the recoverable gold content runs as low as 8 or 10 cents per cu. yd. With equipment

Year	Mines producing	Material treated (cu. yds.)	Gold Recovered		Average per cubic yard
			Fine ounces	Value	
1933	3	11,500	75.26	$ 1,924	$0.167
1934	4	604,000	3,466.04	121,138	.201
1935	24	3,906,000	22,191.47	776,701	.199
1936	30	10,016,000	49,967.54	1,747,864	.175
1937	51	19,364,000	94,142.00	3,294,970	.170
1938	77	24,560,000	118,108.00	4,133,780	.168
1939	* 142	31,618,000	172,519.00	6,038,165	.191

* In 1939, due to movement of dragline dredges, 142 mines were worked by 109 dredges; data on dragline movements for earlier years incomplete.

using a 1¼-yd. shovel or less, the values must run at least 18 cents and the conditions must be of the best.

Problems of the Dragline Operator

It is my intention to paint as nearly a complete picture of this phase of the mining industry as is possible in a short time. Necessarily, then, this picture must start with the problems faced by the operator even before his equipment is placed in operation.

The prospecting or testing of the ground logically is the first and most important step. The depth of the ground is a governing feature and should be determined first so that the proper size dragline may be used from the start. A practical and safe rule is this—the depth of the ground to be mined should not exceed one-third the length of the dragline boom. Thus, a 1¼-yd. bucket works on a boom of about 45 feet and has a practical working depth of 15 ft. The largest dragline equipment now used on a placer operation is located at Dayton, Nev. This dredger has a boom 185 ft. long and the operators have excavated to a depth of 72 ft., or nearly 40 percent of the boom length. Using a 12-yd. bucket, this setup can dig around 12,000 cu. yds. a day under favorable conditions.

Having determined the depth of the placer, the next factor to consider is the type of material to be washed. Reasonably clean gravel with about 40 percent sand content is ideal. The existence of clay constitutes a special problem inasmuch as it must be held in the trommel for a longer period. This is accomplished by means of retaining rings of varying height which retard the passage of the material to permit more complete washing. Capacity, of course, is reduced under such circumstances.

Some clay is known as "robber" clay. It rolls into small balls which pick up fine particles of gold. These are carried to the dump. An experienced tester readily recognizes a condition of this kind, but it is extremely difficult to determine in advance what percentage of the test value will be lost. Mining results sometimes are less than 50 percent of the tests, so extreme care should be taken. Should this condition develop after operations are started, two practices may be followed. Either the flow may be retarded to pulverize the clay and increase the recovery, or increase the yardage. Cost alone is the answer, but in all events such marginal ground should be avoided if possible.

In prospecting, the bed rock also should be carefully noted. If it is hard and rough, the amount of gold on or near it should be determined inasmuch as it is likely all of these particular values will be lost. In mining this type of placer the cost of maintaining the dragline also is greatly increased.

Along these same lines, the percentage of large boulders should be taken into consideration. The cost of removing boulder material represents a flat loss which cannot be regained. If unfavorable bed rock or boulder conditions exist, the test values should run at least 50 percent above normal if profitable operation is to be expected.

Adequate Water Supply is Essential

The last of the pre-operation factors of major importance is the water supply. Especial care should be taken to determine the flow during dry months. Usually this can be ascertained in California. When streams in question fall too low it sometimes is possible to purchase stored water or develop wells. Particularly in dry areas, accurate well tests should be made.

Various local factors influence largely the amount of water required for a dragline operation. In a particularly arid country where the material is dry, between 15 and 20 percent of your water supply is needed to saturate the material. This is lost by evaporation from the waste dump. Under average conditions, a dredge handling 4,000 cu. yds. a day would require 450 gals. a minute or 1 cu. ft. of fresh water per second flowing into the pond. The pumps on the boat

PHOTO BY WESTINGHOUSE

Dragline dredge at work

should handle about 2,500 gals. per minute for washing the average run of material. As I have indicated, however, the characteristics of the material may vary these estimated requirements as much as 50 percent.

The Dredger Type Must be Adapted to the Conditions

Before going into a more detailed discussion of dragline equipment, I would like to explain that there are several general types of dredges now in operation, differing mainly in the method of actually recovering the values. The most common usage calls for a trommel and straight sluice boxes. The material is dumped into the hopper and is washed in the trommel, with everything over three-eighths of an inch going out the stacker. The fine material is handled through the sluice boxes.

The second type uses the same trommel, but instead of washing the fines in sluice boxes, the material is taken into Ainley bowls which wash the sand by means of centrifugal force, leaving the gold and heavy particles in the bottom. These bowls usually are cleaned at the end of each day's operation, while sluice boxes are cleaned once every 7 to 10 days.

Another system using the trommel differs in that a jig is employed to recover the fines. The jig comprises a box of shot agitated by a breathing apparatus which causes the heavy material to settle to the bottom of the box with the lighter waste material being carried off by the water flow.

The one other system now in use differs only in that a large shaker screen is used instead of the cylinderical trommel for removing the coarse material.

Plant Detail

In discussing a dragline gold dredging plant as a whole, first attention should be given to the washing plant, the three different types of which I have just mentioned.

The typical plant is mounted on a barge and consists of a hopper into which the gravel is dumped by the dragline, a revolving screen or trommel, and a belt-conveyor to stack the coarse tailings behind the barge. Large streams of water are pumped into both the hopper and the trommel. The sands that pass through the screen are washed on inclined tables, all of which are divided by partitions into a number of sluices containing riffles to retain the gold. An average barge for a 3-cu. yd. outfit is 48 ft. long, 34 ft. wide and 42 in. deep, comprised of six pontoons, each 8 by 34 ft. Steel for the pontoons is quarter or three-sixteenths and all seams are electrically welded. Earlier barges were made of timber frames covered with three-inch planking and a number of these are still in use.

The hopper, usually made of half-inch welded steel plates, receives the gravel dumped by the dragline bucket. A heavy grizzly prevents large boulders from entering the trommel.

These trommels may vary in some particulars, especially in regard to the spacing of the openings to take into consideration the type of material being worked. A typical three-yard rig, however, provides for a trommel 35 ft. long and 5 ft. in diameter. End sections of 5 ft. each are not perforated. The balance is perforated with ⅜-in. holes with a variety of spacing in the 5-ft. sections. Either perforated pipes or hoses spray the interior and wash the gravel. On most plants such as I am describing, the trommel housing is carried several inches below the level of the riffles into a narrow, depressed steel box running the full length of the trommel. This is provided with baffles or weirs to regulate the flow to the different sluices and to serve as a trap to retain coarse gold.

The 3-yd. dredge usually has 10 sets of riffles on each side of the trommel. They are all 30 in. wide, three are 14 ft. long, three are 11½ ft. long and the remaining four are 9 ft. long. They discharge into sluices running lengthwise of the barge. The grade of the trommel and sluices is 1½ in. to the foot.

Most operators use expanded metal lath of 1-in. mesh over burlap, coconut matting, corduroy or carpeting in the upper half of the sluices running crosswise of the barge immediately beneath the trommel. In our experience the carpet material has proven most satisfactory. Quicksilver is sprinkled on the metal lath at the start of each shift, and the metal lath holds the quicksilver close to the under side of the flow of sand and water where it is most effective in amalgamating the gold. The riffles in general usage are of the Hungarian type, 1¼ in. deep, ¾-in. wide, spaced at 1¼ in. They are made up in sections of a length equal to the width of the sluice. The stacker for the 3-yd. plant is 60 ft. long with a 36-in. belt.

On the smaller rigs where pontoons are not used the washing equipment is either mounted on heavy skids or on caterpillar treads and pulled along by the dragline or a tractor when it is necessary to move. With this kind of a setup it is possible to work with a dry pit and sometimes even clean the bedrock by hand methods. Opinion differs as to how large equipment can be thus mounted, but seldom is it used where the dragline bucket is over 1½ cu. yd. capacity.

Power Units May Differ

On many of the smaller boats the power unit consists of a diesel engine belted directly to a jack shaft to which each unit is connected. This is not satisfactory inasmuch as the arrangement takes up considerable space and, with the starting of the power, all the various units must go into operation at the same time.

On most of the larger boats, a diesel engine is employed to drive a generator and the power is delivered through a central switchboard connecting with separate motors attached directly to the various units. In the case of a typical 3-yd. rig, a 160 horsepower diesel engine is used to drive a generator with an output of 85 kilowatts. This in turn furnishes the electricity for a 50 horsepower motor to drive the pump which requires the greatest amount of power of any of the individual units. A 20-horsepower motor also is used to drive a supplemental 5-in. pump, at times used to regulate the flow of water through the sluice boxes. The trommel requires a 30 horsepower motor, and the stacker 15 horsepower. The desirability of such an arrangement may be readily understood, if only from the standpoint of flexibility.

With the modern diesel engine it usually is possible to generate power at a cost less than it can be obtained from utility companies. This takes into consideration the cost of installing a pole line and the constant moving of transformers. Frequently, of course, power is not available. In the case of a large operation extending over several years, it has been estimated that the outright purchase of available power would result in a saving of ½ cent per cu. yd. This saving would all be lost should the boat be moved to a location where power was not available.

The diesel power unit of which I have spoken will use about 150 gals. of fuel per 24-hour day. The 3-yd. dragline will use approximately an equal amount. It is not my intention to go into any detail here concerning the various makes or types of dragline units used in the various operations. This is standard material moving equipment with which most men are now familiar.

There is one more unit of machinery which is invaluable to any placer operation such as I have described. This is the caterpillar-type tractor, usually powered with a diesel motor and equipped with a scraper or bulldozer blade in front and a winch mounted in back. The principal use is to clear the land of brush and trees and level the ground so that no time is lost in the movement of the dragline shovel. It also is useful in removing overburden and building dams to form the dredger ponds. Also even on the smallest job an electric welding machine is indispensable as part of the shop equipment.

An Estimate of Equipment Costs

At current prices, these units I have mentioned as well as the maintenance equipment will cost from approximately $60,000 for a 1½-yd. outfit, to as high as $500,000 for a 12-yd. setup capable of a daily capacity of from 10,000 to 12,000 cu. yds.

Approximate cost of the different sizes is as follows:

Item	Amount	Cost per cu. yd.
Payroll	$32,800	$.0264
Repairs	10,700	.0086
Gas, Oils and Fuel	8,600	.0069
Other Expenses	3,800	.0030
Compensation P. L. and S. S.	2,800	.0023
Insurance and Taxes	1,200	.0009
Cable	800	.0007
Welding Material	700	.0006
Freight and Express	400	.0003
Total Field Cost	$61,800	$.0497
Depreciation	25,000	.0201
General Office Expense	5,000	.0040
	$91,800	$.0737

In the above no consideration has been given to interest on investment, income taxes, depletion, prospecting, moving expenses, or royalties, all of which have a very wide variance and must be considered.

Dragline Dredges Have Certain Distinct Advantages

Because the production of gold by "doodlebugs" has increased so steadily, it certainly can be described as a successful method of working placer holdings of the proper type. The reasons this is true may be listed rather briefly.

The original cost is low inasmuch as the investment is small when compared to other methods of gold recovery. Both the operating and maintenance costs are low, for the equipment is comparatively simple and almost automatic once the operation is under way.

The equipment used lends itself to easy transportation. It can be moved from one location to another in a short time and can be transported to almost any locality by trucks, plane, railroad or boat.

It has been adequately demonstrated that ordinary bedrock can be cleaned up efficiently with this method.

There are, of course, disadvantages to be considered. The dragline, for instance, will not dig in gravel that is hard and compact, or cemented, as well as a bucket-ladder dredge. Originally the draglines were restricted to a modest operating depth, but new equipment capable of digging to 75 ft. partially eliminates this disadvantage, and is now in competition for ground with the small bucket-ladder boats.

From this it may be seen that the advantages overbalance the disadvantages, if we always keep in mind the fact that the dragline dredge is designed for certain conditions. We believe this type of equipment has served a very real and worthy purpose. We are proud to have been able to add $25,000,000 to the wealth of our country.

Drag Line Boat Capacity	1½ Cu. Yd. 1,200-1,500	2 Cu. Yd. 2,000-2,500	3 Cu. Yd. 4,000-5,000	5 Cu. Yd. 5,000-6,000	12 Cu. Yd. 10,000-12,000
Item:					
Drag Line	$25,000	$36,000	$53,000	$ 90,000	$250,000
Boat	20,000	28,000	50,000	100,000	200,000
Two Buckets	3,600	4,400	5,200	9,000	20,000
Welder	1,000	1,000	1,000	1,000	1,000
Field Shop	1,000	1,000	1,500	3,000	10,000
Bulldozer	7,000	10,000	10,000	10,000	10,000
Trucks, etc.	2,000	2,000	3,000	5,000	10,000
Totals	$59,600	$82,400	$123,700	$218,000	$501,000

To those who have been in business for several years the above will seem large, but the estimate is based on present quotations, and the real cost is apt to even run more for all new equipment, and deliveries cannot be made at all under present priority regulations.

Operating Costs

An operating crew consists of a dragline operator, one oiler and one winchman on each of the three eight-hour shifts, in addition on the day shift there is employed one welder and one caterpillar driver besides the general superintendent or dredgemaster. This average payroll amounts to about $90 per three-shift day or $2,700 per month as work is carried on continuously.

The following is believed to be a fair tabulation of a 3-cu. yd. plant that handled about 1,243,000 cu. yds. of material in one year under fairly favorable conditions actually working 333 days:

Engineers Advise On Metal Demands

Methods by which scrap metal material could be conserved through substitution of less critical material was the chief subject of the recent conference between members of the Engineers Defense Board and representatives of scientific and industry groups. This meeting was the first general gathering of the recently formed Engineers Defense Board with OPM officials from all sections of the Materials Division of the Bureau of Industrial Conservation, the Office of Scientific Research and Development and technical experts from many industries. The Engineers Defense Board is headed by Robert E. McConnell, former chief of the OPM Conservation Bureau, and includes five representatives from each of the major engineering societies. The chairman of the meeting was C. K. Leith, consultant on minerals in OPM.

The situation in copper was discussed by Dr. Zay Jeffries of the OPM copper section; the present position in tin was discussed by Irwin Vogelsang, and David Uebelacker reported on nickel. General discussion revealed that in estimating stockpile requirements, Army and Navy consultants have asked that needs for a three-year period be kept in mind.

Alunite Deposits to be Developed

In the November issue of MINING CONGRESS JOURNAL there appeared an article by Frank Eichelberger of Spokane, Washington, President of Kalunite, Inc., describing the process which the company has developed for the treatment of alunite ore for the production of alumina, and for the subsequent reduction of the alumina to aluminum.

Later reports are to the effect that the Defense Plant Corporation has arranged with the Kalunite Company for the construction and operation of plants at Marysvale and Lehi, Utah, for the production of aluminum, at a cost of about $2,000,000.

It is also reported that two large deposits of alunite are being examined by the company in the Sugarloaf Butte district in Arizona.

Aspects of MINE TAXATION –

● ***These discussions are a revision of some of the addresses presented at the recent Convention of the American Mining Congress in San Francisco. They are given here for further careful consideration by the mining industry, since no questions weigh more heavily on mining operations than present-day taxes.***

TAXES—AN OPERATING PROBLEM

By LOUIS S. CATES
President
Phelps Dodge Corporation

I need hardly say that the mining industry, like other industries of this country, accepts cheerfully and patriotically the unavoidable tax burdens which go with a major defense effort. There are, however, some tax hardships in the present law, the avoidance of which would be good, both for the taxpayer and for the Government itself. Certain parts of the new Excess Profits law are cases in point.

To write an Excess Profits tax law that will equitably treat all the vast and varied business of the country so as to avoid serious and unintended economic harm in individual cases is no small undertaking. And especially is this true where the rates are high. I believe it is safe to say that it is impossible to draft a taxing act, fair to all, to cover in detail all of the thousand and one situations which exist in the business life of the country.

Earlier this year the Ways and Means Committee of the House, with the latter aspect in mind, said:

"Experience with excess profits taxes, both in the United States and abroad, has demonstrated conclusively that relief in abnormal cases cannot be predicated on specific instances foreseeable at any time. The unusual cases that are certain to arise are so diverse in character and unpredictable that relief provisions couched in other than general and flexible terms are certain to prove inadequate."

No General Relief Provisions are Embodied in the Present Law

Now, the startling thing, at this moment, is that in spite of the acknowledged need of relief provisions couched in "general and flexible terms," no such provisions are now in the excess profits tax law. It seems to me that the most constructive thing that I can do now is to make sure that we all understand clearly the danger we are in because the application of the technical parts of the law may bring about results which are fantastic, unreasonable and oppressive. You will yourselves recall instances in which the specification of dates in the law produced sharp and illogical definitions, depending on whether a definite event happened before or after a certain date, and cases in which one competititor is placed at a serious tax disadvantage not experienced by others in its own field because of the way the technical definition of invested capital or the technical definition of net income or some other technical part of the law operates on the taxpayer's special situation.

We had excess profits taxes in this country for the five years 1917-1921, inclusive. They were successfully administered under a law which contained the kind of relief provisions that cannot be found in the present law.

Relief Provision Needs to be Considered

The Finance Committee of the Senate, I am informed, believes that the law needs to be amended so as to restore a broadly-phrased relief provision. But so far no amendment in this respect has been made. There has been considerable talk of a second so-called "administrative" bill designed to improve the fairness, workability and productivity of the existing law. For that reason it is timely for all of us to consider now what can be done with regard to relief provisions of this type.

Reports from Washington indicate that there has been some doubt on the part of persons concerned with taxation policy as to whether there is a general demand for such a provision. It seems to be true that many taxpayers who are likely to need the application of such a provision do not yet understand that they are likely to need it. For one thing, a good deal has been said about "relief" provisions which are at present in the law, and it is only gradually coming to be realized that, while they are useful to those that can come within their terms, their scope is narrow and the relief afforded is sharply limited.

Present Wording of Law Establishes Inequities

For example, Section 722 of the present amended Excess Profits Tax Act appears to provide some measure of relief for the taxpayer who establishes that the character of his business as of January 1, 1940 is different from the character of his business during one or more of the base period years 1936 to 1939. The rules for the application of this provision say, among other things, that the character of the business is deemed to be

different when "there is a difference in the capacity for production or operation."

However, this relief provision is more apparent than real, because the character of the business must be different as of January 1, 1940—not January 2, 1940, or indeed any other date subsequent to January 1, 1940. An increase in the capacity for production or operation presupposes planning. Because these relief provisions apply only in instances where such planning and work have resulted in an increase in capacity in effect as of one certain day, namely, January 1, 1940, the provisions are inoperative for all practical purposes in many cases. Obviously, it would be a fortuitous sort of thing for additional plant, planned for six months, one year or more prior to January 1, 1940, to be available as of January 1, 1940 and not January 2, 1940 or some time later.

To illustrate the working of this section, take the case of two small mining companies, each of which planned prior to January 1, 1940 to build a new mill. One of the companies by chance happened to have the additional capacity installed and operating on January 1, 1940, while the other company's mill was not completed and operative until, say, February 1, 1940. Let us assume that the earnings from both these properties for the year 1941 would be the same — say $100,000 — and also that their excess profits credit (before adjustment under Sec. 722) is the same, namely $50,000. The addition to the facilities which, in the one case was added as of January 1, 1940, and in the other case as of February 1, 1940, resulted in increased income of, say $50,000 in each case for the year 1941. Under the present law, the mining company whose additional facilities did not begin to produce until February 1, 1940, and therefore could not qualify as having additional capacity for operation as of January 1, 1940, would pay 21 percent more income and excess profits taxes for the year 1941 (and each year subsequently under like circumstances) than the company which happened to qualify as having additional capacity for production or operation as of January 1, 1940. This differential would inincrease substantially if the income were larger, when higher excess profits tax rates would apply.

As I have just indicated, mine operators will find many cases in which this relief provision, for every practical purpose, will be inoperative. It would seem that it should not be the purpose to deny the relief which Section 722 otherwise provides, in the case of planned additions to capacity for production undertaken prior to, but uncompleted, at January 1, 1940.

Bureau of Internal Revenue May Audit Tax Returns Differently than Companies Do

Another thing—the Bureau of Internal Revenue has as yet made no audits of 1940 excess profits tax returns, so that executives, to a large extent, are assuming that their approximate tax liabilities are indicated by their tax returns as filed. The Government, so far, has not indicated its position on a very large number of doubtful points in the law. But when the Government begins to take up these points and to claim deficiencies it seems likely that many taxpayers will be surprised; the figure which we thought was our invested capital or our base period income may turn out to be very different from what the Government audit holds the correct figure to be. Relief may be sorely needed and justified, but unless general relief provisions are embodied in the law the Government will be powerless to act.

Many executives, recognizing that excessive hardship will result to their own companies from provisions in this law, have been hoping for specific amendments to correct the particular situations which they have in mind. So, also, THE AMERICAN MINING CONGRESS has been doing invaluable service in seeking to amend in the law a considerable number of points at which they see the law will give unsatisfactory results. But even if we could hope—as we cannot—that each of the now evident defects will be corrected, there is still the mass of unforeseeable effects in unusual situations, referred to by the Ways and Means Committee, as previously quoted. In the field of natural resources, the hopelessness of trying to cover everything in the technical part of the law is particularly evident, because of the uncertainties which are inherent in any natural resource business.

Looking at the whole picture as it presents itself today, I myself am convinced that what the Ways and Means Committee report says is true, namely, that no one, either in the government or in business, can foresee the ways in which the rigid provisions of the present law will cause unintended and unnecessary discrimination. I submit to you, further, that every business subject to the excess profits tax needs to make sure right now that the members of Congress understand that there is a demand for the enactment of broad relief provisions such as the other excess profits tax laws have contained. That can be accomplished only if you gentlemen will each take this up with your tax advisors and explain this situation to the men who represent you in Congress. It is too important a matter to leave to others, and only by immediate and intelligent interest on the part of every one of us can proper legislation be expected.

The Excess Profits Tax and Mining

By ELLSWORTH C. ALVORD
Counsel, American Mining Congress

I will attempt to ease your minds somewhat by telling you that I won't be too technical. The technical end of taxation has been pretty well covered by numerous works of your Committee on Taxation. If you want the technical side, you can read those, or any of us will be glad to talk to you after this meeting.

In order to see something of the future, let's attempt to find out where we stand now. Your present National Defense Program will cost you $74 billions. That was true the day before yesterday. Much more is still to come. In all probability $100 billions is not the maximum. In addition, you still have the normal functions of the Government to pay for. You are spending this year the sum of $24½ billions for both National Defense and what some people call the "ordinary" functions of the Government.

Next year, on the basis of the figures we now have, you will spend at least $32 billions—and if past performance is any criterion, your actual expenditures will probably exceed that figure.

These expenditures have to be financed somehow. It has been the belief of your Committee on Taxation that the problem of financing ought to correlate with, and assist in attaining, our other objectives.

I suppose all of us will agree that Objective Number One today is more speed in production for National Defense. That doesn't mean solely ships, guns, tanks, and planes. It means the production and development of all materials necessary to go into ships, tanks, guns, and planes. It means the construction, conversion, and maintenance of plant and equipment to do the job. It means the removal of barriers to expansion, and to the uninterrupted flow of defense production.

Taxation Has Other Objectives than Revenue Only

I think we would also agree that we should, if possible, have a tax system which will assist in checking inflation. We must also, if possible, avert the threatening "civilian depression" and prevent the annihilation of small business. The tax system should contribute to those objectives. Again, we should have a tax system which will give us a chance to soften the shock of the terrific post-war depression, which we all know lies ahead. Finally, we believe that we should have a tax system consistent with a temporary dictatorship during the war period, but which will permit a termination of that dictatorship immediately after the emergency.

I am going to be very frank. There is, in my opinion, a direct issue between the Executive and Administrative branches of our Government. You have seen the recommendations of the Treasury Department with respect to an Excess Profits Tax based solely on invested capital. Those recommendations, fortunately, have been defeated twice by our Congress. You saw the other day the recommendation of the Secretary of the Treasury that the entire Excess Profits Tax should be based upon a 6 percent return upon the original investment.

Proposed Tax Systems Would Destroy "Free Enterprise"

It is not necessary for us to preach that a tax system based upon either the earlier recommendations of the Treasury Department or the latest pronouncement of the Secretary of the Treasury will not only interfere with the objectives which I have outlined, but unquestionably will mean the death knell of what we call "free enterprise." We don't have to preach that; it is known. If we are going to prevent those results, it seems to me that you gentlemen must participate, through your representatives in Congress, in the fight that lies ahead.

For example, let us look at the basic policy of the present Excess Profits Tax. I am confident that some officials desire that an Excess Profits Tax should be a permanent part of the Revenue System. Why? Because in the minds of a certain group in Washington, they are the only group capable of defining and deciding how much profit a business enterprise should make.

Excess Profits Tax Should be Designed to Prevent War-Time Profiteering

Your Tax Committee has, of course, taken precisely the opposite view. We feel that an Excess Profits Tax is a perfectly proper measure for the period of the emergency, but that it should not be designed for the purpose of producing revenues. It should be designed solely to prevent war-time profiteering by limiting excess profits. In our opinion, the less revenue produced by the Excess Profits Tax, the sounder will be the economic condition of our country. We know that if the Excess Profits Tax is limited to its proper purpose of taxing only true excess profits, certainly for 1940 and 1941 it will not yield anywhere near the Treasury estimates of revenue.

The Treasury view, however, is that we should use the Excess Profits Tax as a revenue producer, and it accomplishes this purpose by subjecting to the necessary and proper high rates of the Excess Profits Tax a very substantial amount of normal profits. This is done under the present law by very arbitrary definitions and by insistent opposition to every provision which will assist in giving a proper yardstick for normal profits. It is done by refusing to recognize that profits attributable to the skill, ingenuity, initiative, and ability of the individual are nevertheless perfectly normal profits, which, actually, should be protected, not confiscated. It is done by measuring the Excess Profits Tax solely by the results of one calendar year, even though you happen to be in a "feast or famine" business with large profits in two years out of five and large losses in the other three.

Your Tax Committee, on the other hand, thinks that there are perfectly sound devices—presently existing in the English and Canadian law—for measuring and averaging excess profits over the period of the emergency.

Inflation Encouraged by Consumer Subsidies

As a further illustration of the opposition of the present law to one of the most important of our objectives, let us turn to the problem of inflation. In my honest opinion, the real seeds from which your present fiscal condition has grown were planted back in 1933 and 1934. Those seeds have been allowed to grow, and have been nourished. To me the growths have every appearance of destructive weeds. But they are still there. So far no real effort has been made to destroy them!

We are not going to avoid inflation until appropriate changes are made in the monetary policies of your Government. We are not going to avoid inflation so long as consumer subsidies created during the depression are maintained at the level of $2 billions and more a year. Nor are we going to avoid it until an honest effort is made to reduce the annual deficit by the elimination of non-essential, non-defense expenditures of all kinds.

What methods beyond monetary control are today being advocated?

You hear of the so-called Price Control Bill, but it is well known that the only effective price control measure is a drastic over-all measure similar to that in force in the totalitarian countries. I do not advocate it; yet that is what we must have if it is to be effective.

We are told, also, that to curtail tremendous consumer purchasing power we should borrow directly from the public instead of from the banks. I am in entire accord with that policy. Government borrowing from banks has always been treacherous and dangerous. I cheerfully commend the efforts of the Secretary of the Treasury to borrow from individuals. I hope it works!

Then we come to our taxing power as a control on inflation. Let's tax excessive consumer purchasing power and siphon it back to the Government —that happens to be one of the principal arguments which the Secretary of the Treasury made in support of the Revenue Act of 1941. But the figures do not prove his point. That Act produces about $3½ billions of new revenue over a full year. It gets $1 billion of this total from additional or increased excise taxes upon a selected list of commodities. It collects $1½ billion from corporations, principally from excess profits taxes. It collects $1 billion from individuals, all except about $30 millions coming from existing taxpayers.

"Never in the History of Our Nation Will so Much be Owed by so Few"

I can describe that part of the law dealing with individual taxes very briefly, if you will permit me to paraphrase the now famous statement of the Prime Minister of England: "Never in the history of our nation will so much be owed by so few." Almost the entire burden of the increase will be thrown on the shoulders of about seven million persons, constituting about 15 percent of the total population and one-eighth of the gainfully employed. The heaviest increases will fall on persons in the $3,000 to $20,000 group—the so-called "middle class." Is liquidation of this group one of our objectives?

There is nothing in this Revenue Act which will act as an effective curb upon inflation. The only measuring stick used by the Secretary of the Treasury to determine upon the $3½ billions total was that we should tax for two-thirds of our expenditures and borrow one-third. By reason of increases in the estimates of expenditure, that yardstick was out of date 10 days after he proclaimed it. Think what the tax system will be if we attempt to tax for two-thirds of next year's expenditures—$32 billions!

Withholding Tax Would be Simple and Effective

Your Tax Committee will agree with me, I know, that there is no logical basis for any such mathematical formula. We offer you a much more simple principle, one which we think should be applied. We are confident that the American nation will be behind it. It is—tax just as heavily as you can, and then borrow the rest. If that were done, you would reach a very important group of taxpayers in the United States. It might require the adjournment of politics to reach that group, but if they fully realize what the effect would be, their political influence would be on our side. In this connection, it is significant to note that the national income increased approximately $16 billions from 1940 to 1941. Almost 80 percent of that increase will go to persons making less than $5,000 a year. There is where your inflationary dynamite exists!

There is a very simple device by which all groups can be reached. It will cost practically nothing to administer and it will yield practically

Internal Revenue Building, Washington, D. C.

100 percent. It can go into effect without delay and it can also terminate without delay. This device is a withholding tax, collected at the source, upon all forms of compensation and dividends and interest paid to individuals. Not only would it help tremendously in producing revenues, but it would also permit tax policies to be framed upon principles which we would wish to have in force, and would have the desirable result of making exery taxpayer concerned with the way his money is spent.

You have heard reference to the so-called "Administrative Bill," to be considered soon. This is described as a bill to make the law more workable, more equitable, and perhaps more simple. It will also be a bill renewing the fight on community property and depletion allowances. The objectives of more equity and simplicity will not be the only objectives!

I only wish that I could bring a much happier picture to you. Bear in mind that a few men in Washington cannot change the result. This is a matter that concerns the entire United States. If you want to participate, I can give you no assurance of success, but the opportunity is yours.

Effect of Present Federal Tax Policy on Mine Valuations

By HERBERT C. JACKSON
Pickands Mather & Company
Cleveland, Ohio

THE present and prospective heavy taxation of earnings by the Federal Government operates to decrease the value of practically all capital assets under the value they otherwise would have. The value decrease is most pronounced in those assets which possess worth chiefly because they may be expected to yield future income. Mines are this type of asset. Yet State assessing authorities in valuing mines for real estate tax purposes do not generally recognize the Federal tax cost to the extent necessary to produce true values. Some State Tax Commissions permit the use of only a part of the Federal tax cost in arriving at mine values, and other State taxing authorities eliminate all Federal tax costs in computing estimated future profits on which the values are based.

Federal and State Taxation Affects Capital Values

A look at the stock market should be convincing evidence of the effect of high Federal taxes on capital values. For example, in January, 1939, after the very lean year of 1938, the Dow-Jones average of industrial stocks was 155 and now at a time when production is booming the average is around 125. There has been a 20 percent decrease in values, while industrial production has jumped 55 percent. The Federal tax program is only one of the factors adversely affecting these values, but it is the chief one. The price premium enjoyed by tax-free bonds over other bonds of equal investment safety is another example of the effect of Federal taxes on capital values. With the outlook for continued high taxes for a generation to come on account of the mounting government debt, the value of capital assets is decreasing, and particularly those assets, such as mines, which derive their value from future expectancy of profits. When State taxing authorities shut their eyes to this fact and attempt to compute mine values without taking into consideration the full effect of the important factor of Federal taxes, the mine valuation structure is dislocated and mine owners are unjustly penalized compared to owners of other real estate where value is usually determined by current sales prices.

There are relatively few sales of active and producing mines and this fact has necessitated the computation of their value for assessing purposes on a theoretical formula which attempts to discount present worth or the future expected profits. My experience in mine valuations has largely been confined to the value of iron ore mines in the Lake Superior District states of Minnesota, Michigan, and Wisconsin. At one time or another I have participated in the valuation of a large number of these mines either for merger purposes or for outright purchase by the company which I represent. In all cases where the mergers have been consummated or the mines purchased, the values at which these mines changed hands were considerably less than the basis on which they were assessed. Generally speaking, I would say the actual sale price of the mines was about 50 percent of the value used as the basis of assessment by the states. Valuations computed on a theoretical basis of estimated future profits are apt to be excessive, and where insufficient allowance is made for the present and prospective high Federal taxes, the valuations are becoming increasingly excessive.

Excessive Taxation Reduces Valuation of Properties

When Federal taxes were within reasonable limits and were a relatively small item of cost, the difference in the theoretical value of mines arrived at by including or excluding this item was relatively small. Now, however, with Federal taxes taking about 50 percent of the profit, the need to give full recognition to this item of cost is urgent. The outlook for profit to a mine owner is like that of a man standing on a railroad track and looking along the track toward the horizon. The rails converge to a point and the space between vanishes. So do mine profits as we look into the future and view the converging lines of increased costs and fixed prices, which wipe out the intervening space we used to call profit.

Federal Taxation Affects Particularly Mines Values

Confronted with the evidence, taxing authorities are likely to say that Federal taxes affect all values and therefore should not be considered in estimating future mine profits. The fallacy of this argument is that while the value of other assets which have a relatively free market is affected by the high Federal taxes, such effect is re-

flected in current sales prices, which in the long run fix the assessment basis. In order to equalize mine values, which are not set by actual sales, with values of assets which are governed by actual sales, it is necessary in such mine values to take into consideration the important factor of Federal taxes.

In mining communities mines are usually assessed at values greater than their true value, while other local properties are underassessed. This is a situation which, of course, should be corrected. In as much as it exists, however, taxing authorities should recognize any legitimate element of cost which affects mine values in order to prevent further disparity between the relative levels of mine valuations and assessed values of other local property. There is no valid reason to eliminate any item of cost in computing profit.

Where mines are assessed on a formula basis of discounting estimated future profits, mine owners should insist on the inclusion of Federal taxes as an item of cost. Where this has been an issue in court cases involving the valuation of mines, the court has recognized Federal taxes as a legitimate cost item. The inclusion of Federal taxes at the present rates would decrease mine values from 15 percent to 25 percent under those computed without reference to Federal taxes.

Determination of Gross Income For Percentage Depletion

By JAMES A. RUNSER
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PERHAPS it should be ruled out of order to say anything further about added taxes, but maybe you are like the prize fighter who is "punch drunk" so that another blow or two will not be noticed. Anyhow, I should like to point out the effect of a comparatively recent amendment to the Income Tax Regulations with respect to the method of establishing gross income from a mineral property for the purpose of computing percentage depletion. In many instances, the amendment will have the effect of reducing the gross income, which, in turn, means a reduction in percentage depletion with a corresponding increase in taxable income.

Amount of Gross Income Determined by Crude Mineral Price

Gross income from a mineral property is defined in the regulations as the amount for which the taxpayer sells the crude mineral product in the immediate vicinity of the mine or well. In other words, the field price of the crude product determines the amount of gross income for percentage depletion purposes. The regulations further state that if the product is transported or processed before sale (other than by the processes allowed by the regulations), gross income means the representative market or field price of crude mineral product of like kind or grade before such transporting or processing. Either of these sets of circumstances ordinarily lends itself to a ready determination of gross income and such taxpayers are not confronted with serious problems in establishing percentage depletion.

Basis Is Unfair to Mines Beneficiating Ores

However, there are many metals which are not customarily sold in the form of crude mineral product, and so it is difficult or impossible to establish or substantiate an equivalent field price for the crude product. It is in those cases that the new regulation seems to place the determination of gross income on an unfair basis. Under such conditions the regulations prescribe that there shall be used in lieu of the field price of the crude product the representative price of the first marketable product thereafter, less the costs and proportionate profits attributable to other than obtaining the crude product. In such instances the taxpayer is at a distinct disadvantage, as the method prescribed for determining gross income will result, as a rule, in a smaller gross income than would be the case if a field price existed for the crude product. Prior regulations permitted the use of the gross income from the product sold less only the costs of processes beyond the crude state of the metal, but the current regulations also penalize gross income for the amount of the proportionate profits attributable to the non-allowable costs.

Example Illustrates Conditions

Now, as a practical matter, what is the disadvantage to the taxpayer in cases where a fair price cannot be established for the crude product? By way of illustration let us use a gross income of $1,000,000 as representing the amount realized from the refined metal. Further, we will assume that $360,000 is the cost of obtaining what the regulations define as the crude mineral, which for most metals would be through the stage of concentrating by gravity or flotation. We will assume also that $40,000 is the cost of refining the crude product, so that total costs aggregate $400,000, of which $360,000, or 90 percent, represent allowable costs, and $40,000, or 10 percent, represent non-allowable costs. The resultant operating profit would be $600,000. Administrative and overhead expenses are not considered, as these presumably would be allocated proportionately to the allowable and non-allowable costs.

In this illustration, the gross income for percentage depletion would be reduced by the non-allowable costs of $40,000 plus the proportionate profits attributable to these costs. The proportionate profits would be 10 percent of the $600,000 operating profit, or $60,000, which with the $40,000 non-allowable costs gives $100,000 as the total amount disallowed. Therefore gross income would be reduced from $1,000,000 to $900,000 for percentage depletion computations. Now, the principal point of contention is reducing gross income by an arbitrarily determined figure for proportionate profit, which in most cases would be entirely out of line with the profit that a company engaged in refining such products would expect to realize. In such cases, the taxpayer would not have as great a gross income basis for

(*Continued on page 65*)

1942 COAL CONVENTION PROGRAM OUTLINED

● ***National Chairman and State and District Chairmen meet to correlate suggestions and plan program for 1942 Coal Convention and Exposition.***

J. NOBLE SNIDER
National Chairman

WITH the country surging mightily ahead in its rearmament effort, with calls going out daily for more and more production, and with the nation facing more and more down the road to war, a definite feeling exists among coal operators and manufacturers that the 1942 Coal Convention and Exposition of the American Mining Congress will be one of the most important meetings in the history of the industry. Always complex, coal mining now has added problems of increasing production without the certainty of continued prompt delivery of necessary equipment and supplies. To obtain greater and more efficient production, mechanization of the mines is proceeding at an accelerated pace and, as this continues, the problems of production and supply are multiplied; as a result, new standards, specifications and working methods have to be formulated.

In planning for the coming convention, the Program Committee has accepted its responsibility to accomplish an outstanding constructive job for the industry. The various state committees, covering all the producing coalfields, held meetings during the latter part of October to submit program recommendations from their districts. These were intended primarily to indicate those subjects which each field was most interested in having presented and discussed at the convention sessions; in addition, numerous suggestions were made on ways to arouse interest, increase attendance, and promote floor discussion.

On November 12, following these individual district and State meetings, the National Program Committee met at Cincinnati under the direction of its chairman, J. Noble Snider, vice president of the Consolidation Coal Company, to consolidate and correlate into a working program these numerous recommendations. While the mass of suggestions received would seem to render the task of the National Committee difficult, in actuality it was simplified because all districts were in general agreement as to those problems and subjects which are of greatest importance at this time. Unanimous agreement was also expressed in the sectional meetings, that the value of the convention sessions was so great that no company could afford to overlook the opportunity to participate, and that Program Committee members could render a real service personally by their cooperation in having men attend and participate. This applies not only to the operators but also to the manufacturers. It was recommended that a special invitation be extended to exhibitors to attend the sessions and take part in the discussions.

All agreed that the floor discussions could be made a most valuable part of the program and, in order to build up this feature, it was felt many of the sessions could be limited to two major papers, and that an effort should be made to extend the "open forum" idea. In particular it was recommended that the "Information—We Hope" feature of the 1941 convention be amplified and arranged as a vital part of the convention.

The problem of the committee then became one chiefly of elimination. With so many questions of vital interest to the industry, it was quite a task to select those which had the widest application. In making its selection the committee stressed the fact that the program papers should not consist of lengthy descriptions of operating methods, since operating men today are, in general, familiar with the usual practices of mechanized mining and preparation; the information desired now pertains to the limiting factors in determining methods of operation and in choice of equipment,—the "why" of practices at particular mines under particular conditions. A knowledge of economic factors involved is really the key to successful operation, and the committee especially desires to make up a program that will emphasize questions of this nature.

Coal mining of every type and in every field has problems of common interest but, in addition, certain branches of the industry have individual problems, and the annual convention is the place for all coal mining men to get together for an exchange of ideas. Coal stripping and anthracite mining, with certain methods of operation peculiar to themselves, will receive special attention in that there will be two sessions devoted to the problems of the strip mining field and one on anthracite mining; these will be held in a separate meeting room at Music Hall and will be arranged at times when the general sessions are discussing problems of special interest to bituminous underground mining only.

Another worth while feature of previous conventions and expositions, to be retained and enlarged, is that of the "Miners Exhibit." This feature gives to mine foremen, master mechanics, electricians, shop foremen and operating men the opportunity to display their own home or shop-made devices for increasing efficiency, reducing labor or other mine costs.

Tentative Subjects for Program Papers

Mechanical Loading

Organization of operating crews, effect of unit tonnage on overall mine efficiency.

Mining methods, pillar recovery, and service haulage.

Conveyor Mining

Conveyor methods, mechanical and hand loading, gathering belts.

Economics of various operating phases of conveyor mining.

Surface Preparation

Auxiliaries of mechanical cleaning; drying, dust control, water clarification.

Determination of amount of slate to be removed underground and at surface plant.

Equipment Maintenance

Shop practices, location of shops, frequency of equipment overhauling, records and inspections.

Ventilation

Sealing vs. ventilating mined areas, quantity and quality surveys.

Management

Organization of supervisory and operating personnel for mechanical mining.

Face Operations

Cutting, drilling and blasting as affecting efficiency and quality of product.

Safety

Resume of general safety practice and methods to reduce accidents.

Ways of impressing safety on men.

Roof Support

Physical characteristics of mine roof, causes and prevention of roof falls.

Underground Power

Underground distribution for mechized mining, a-c cable vs. surface line with bore hole.

Vocational Education

Training for foremen, supervisors, machine operators and maintenance men.

National Economic Problems

Two papers on subjects of national importance, such as Priorities, Defense, etc.—the titles and authors to be selected later.

State Chairmen

Pennsylvania

F. B. DUNBAR
Mather Collieries

West Virginia

CARL SCHOLZ
Consulting Engr.

Ohio

S. W. BLAKSLEE
Powhatan Mining Co.

Indiana

H. P. SMITH
Princeton Mining Co.

Illinois

FRED A. MILLER
Franklin County Coal Corp.

West Central

A. E. MARRIOTT
Marriott-Reed Coal Co.

Rocky Mountain

GEO. B. PRYDE
Union Pacific Coal Co.

Strip Mining

WM. L. BURT
Jefferson Co.

Anthracite

R. E. HOBART
Lehigh Navigation Coal Co.

Tennessee

STANLEE HAMPTON
Tennessee Consolidated Coal Co.

Alabama

ROY RATLIFF
Sloss-Sheffield Steel & Iron Co.

Virginia

W. C. SHUNK
Peerless Coal Corp.

Kentucky

W. J. BORRIES
Dawson-Daylight Coal Co.

With the COAL DIVISION

of the AMERICAN MINING CONGRESS

Annual Conference

of DIVISION COMMITTEES

Conference of Committees of the Coal Division of the American Mining Congress held in Pittsburgh on November 21. Results of past year reviewed and plans laid for continuing and increasing committee work during the coming year. Evening banquet addressed by Dr. Wilbur Nelson, Administrator of Mining Priorities, OPM, and D. L. McElroy, Assistant Administrator in charge of Coal Mining Priorities.

THE importance of the constructive work of the Coal Division of the American Mining Congress, particularly in these times when a plentiful supply of fuel is a prime requisite for success in our defense effort, was forcibly illustrated at the Annual Conference of the Coal Division Committees held at the William Penn Hotel in Pittsburgh on November 21. Approximately 140 coal mining men attended the meeting and took part in the deliberations of the committees during the day, followed by a banquet in the evening. Individual committees reviewed accomplishments of the past year, and suggestions and outlines for the future course of the work were recommended.

In the morning, after a general opening session, the conference broke up into meetings of the individual committees on Mechanical Loading, Conveyor Mining, Haulage Roads, Underground Power, Roof Support, Surface Preparation, Stream Clarification, Ventilation, and Safety. In the afternoon, at a combined session, the various committee chairmen and members reported on results already accomplished and on plans for the coming year. Some of the committee reports completed and in preparation were summarized, several of them being presented with slides prepared for the occasion. Many of these reports have appeared in the pages of MINING CONGRESS JOURNAL during the past year. A summary of each committee's report is presented on a following page.

This was the Seventh Annual Conference of the Coal Division, the first of which meetings was held at Penn State in the fall of 1935. From the beginning, the Coal Division work has been predicated upon the thought that the coal industry receives inestimable benefit through the free interchange of ideas and information among the executive, engineering, and operating groups, and through detailed studies for the proper technical solution of specific operating problems. During each year, these committees representing all sections of the country and all phases of the industry continue their program by correspondence and by individual committee meetings, culminating in the Annual Conference. Results of the deliberations are broadcast to the industry, not only through MINING CONGRESS JOURNAL's pages, but also through the Coal Mine Modernization Yearbooks and special publications as required.

The morning session was called to order by Julian D. Conover, Secretary of the Mining Congress, who remarked that in the past seven years the work of the Coal Division and its committees has been greatly broadened, and that the increasing interest shown is an encouragement to continued efforts. He expressed the appreciation of the industry to the committee members who have given so much of their time and personal effort in the work. To meet the heavy demands on the industry, he added, which this year will amount to well over 500,000,000 tons of bituminous coal alone, and with an unknown additional amount required next year, will require real effort on the part of all if coal is to be mined efficiently and safely. Operating and equipment problems are multiplied, particularly now that priorities are a part of the picture; concomitant with that personnel and safety problems are likewise multiplied.

Following the deliberations of the individual committees, in the early afternoon the general conference and reports of committee activities got under way, following an address by R. L. Ireland, Jr., chairman of the Coal Division, and president of the Hanna Coal Company. Mr. Ireland remarked that he had been connected with this work for years and that through it he hopes complete mechanization of the mines may be brought about. He continued, "I can see it coming and I think it is largely because of the work of the American Mining Congress and of these committees who are working out joint standards between the operators and the manufacturers, thus giving a basis on which to proceed and saving many people costly mistakes. Our work is not yet completed and much remains to be done but I am glad to see the serious manner in which the committee members are proceeding in their task.

"Today we must consider a third string to our bow. With a rapid rate of mechanization and changes in methods, we are still trying to maintain a maximum degree of safety in the mines, and at the same time we are

pioneering in new fields without previous experience to tell where the danger points are. To that end the work of making our safety practices keep pace with our efficiency is of utmost importance.

"The Federal Mine Inspection Act is in effect and we should take advantage of our opportunities for cooperation. The Bureau has been valuable to us in the past as a consultant; this is now to be supplemented by the Mine Inspection Service. If we grasp this opportunity properly, we will take advantage of this Federal Mine Inspection as a further source of information on which we can capitalize. If we approach properly our problems of mechanization, taking advantage of the mechanical knowledge of the manufacturers, the practical knowledge of the operator, and the technical advice of the Bureau of Mines, we should have a triumvirate which will give us the right answer to our problem."

Annual Banquet

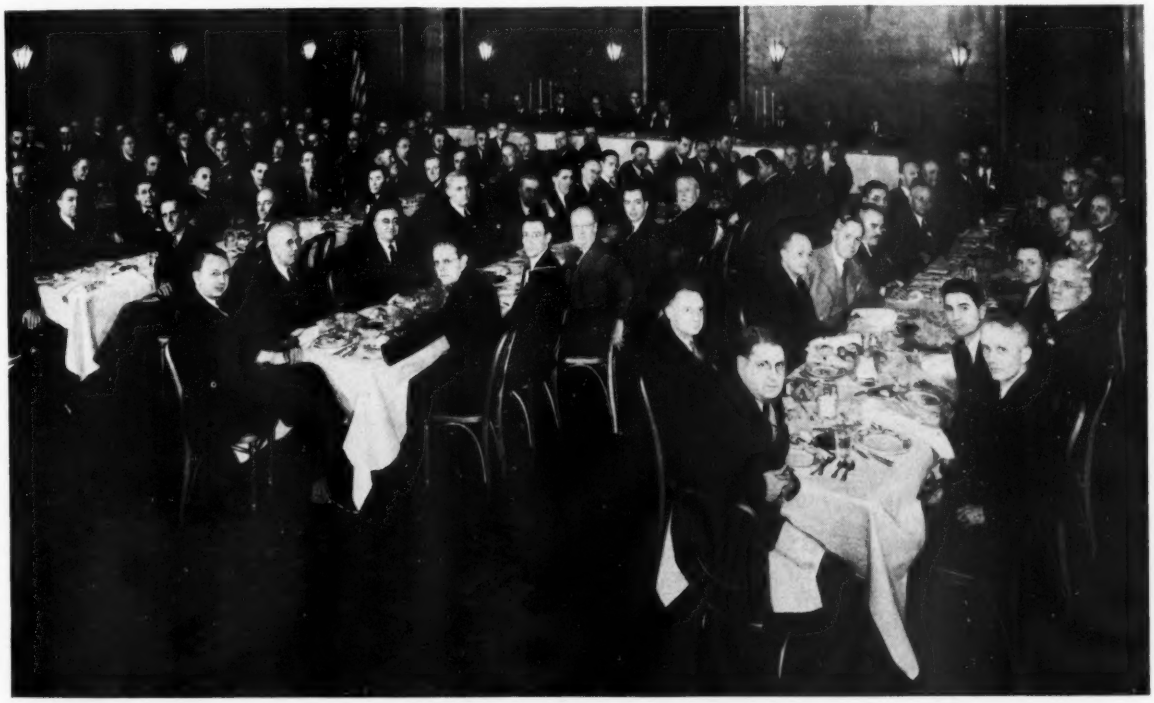
A capacity crowd attended the annual banquet in the evening. Following the dinner, Secretary Conover read a telegram from J. Noble Snider, National Chairman of the Program Committee for the 19th Annual Coal Convention and Exposition of the American Mining Congress to be held in Cincinnati from April 27-May 1. Mr. Snider regretted that the press of business prevented him from attending. He added:

"Please convey my congratulations to all present upon the valuable contribution which they are making in the present emergency and my sincere thankfulness that our industry in its time of need may rely with confidence upon the ability, good judgment and integrity of the operators and manufacturers who are cooperating so unselfishly in this work. May I say that your efforts for safety and efficiency in coal mining are deeply appreciated by every one I know in the industry. I look forward to seeing all of you in Cincinnati at the 19th Annual Coal Convention and Exposition of the American Mining Congress next April. In the present period of national stress, I know we may count upon your full cooperation in making this the most constructive meeting which our industry has ever held."

Mr. Ireland, as Chairman of the Coal Division, presided for the remainder of the evening, first introducing those at the head table. John W. Haddock, vice president of Sullivan Machinery Company and vice chairman of the Manufacturers Division, was then called upon, as the representative of the manufacturers present. Mr. Haddock said that the manufacturers had many problems, which have become increasingly difficult in the last few months. Two of these troubles, he said, were the difficulties of getting materials and the necessity of getting efficient production out of the new and inexperienced men who are now being hired. The question of materials, he added, is probably the biggest problem, and the American Mining Congress organization has done a wonderful job in assisting the manufacturers and the mining industry to get the recognition they needed in order to obtain materials. He also said that the principal speaker of the evening, and the men working with him, have done a noble job and they deserve both from the miners and manufacturers every bit of support they can be given. He said that he did not believe the manufacturers or operators in any other branch of industry had been as well treated or had been given as much cooperation and as much help as the manufacturers of mining machinery and mining operators have, which he attributed to the capable men who have been working on the problem. He promised the cooperation of the manufacturers in these efforts.

Dr. Nelson Speaks on Mining Priority Procedure

The principal speakers of the evening were Dr. Wilbur A. Nelson, Coordinator of Mining Priorities for the



Banquet meeting of Coal Division at Pittsburgh

OPM, and his assistant, D. L. McElroy, who is on leave from his duties as Dean of the Mining School of West Virginia University in order to assist in the administration of priorities for coal mining.

Dr. Nelson spoke at length and to good effect on the administration of the various priority orders and preference ratings as they apply to coal mining—a subject in which all mining men and manufacturers are now most vitally interested. He explained in detail the manner of administration of the P-56 order, the way in which it is administered and the manner and the form through which the mines and manufacturers comply with this order or rating. A mine is given a serial number from the State Emergency Coordinator; at the present time serial numbers are not given to coal mines employing less than ten men, unless the mines are producing a considerable tonnage. Under the P-56 order a mine with a serial number then gets an A-8 rating for necessary materials, if such a rating is necessary to obtain them. The procedure has been simplified as much as possible. In addition, an A-1-a rating can be given in the case of emergency breakdowns. In the latter case, a mine can call, phone or wire the Washington office, giving the circumstances of the breakdown, the name of the supplier and the mine's rating number, and if parts are available, can get them within 24 hours. If one does not have an actual breakdown, but the State safety inspector says machinery must be supplied in order to avoid breakdown which would endanger safe operation, the situation may be treated as an emergency upon certification as such by the State inspector.

Wilbur Nelson

He also explained that all mines must list once a month, and file with the OPM, all items purchased or received on the rating order. These items may be grouped according to the usual inventory procedure at each property; later the inventory grouping may be standardized.

He added that the priority system is run on the honor system and must have the cooperation of all concerned in order to obtain the desired results. There is a big job to be done and all factors must work together in its accomplishment.

Also incorporated in the priorities system is inventory control, by means of which the inventories at mines must not exceed the average inventory of 1938, 1939 and 1940, proportioned to the tonnages produced. If there have been changes in the mining methods, the inventory control system may be changed to suit, after proof is provided in each individual case.

He also explained that if the A-8 rating does not produce the needed materials, the PD-1 form may be used, but should not be employed unless the materials are really needed immediately and the items are important.

To secure compliance with these procedures, he added, the Office of the Coordinator has the privilege of taking away the serial number of a company if the company does not conform. Some time in the near future the procedure may come to a quota system, after the P-56 forms have indicated the total amount of materials needed to keep the mines going. In order to make a success of any quota system, the Government must also have full support for the method.

D. L. McElroy, Dr. Wilbur Nelson's assistant for coal mining, was then called upon. He amplified some of the statements made by Dr. Nelson and explained in more detail the manner in which the forms are handled in Washington. Following this the meeting was open for a questions and answers session, during which time many people in the audience questioned Dr. Nelson and Mr. McElroy on the manner of procedure in specific cases and under particular circumstances. Both of the speakers gave freely of their knowledge and time to reply to all questions raised.

Reports of the Committees

At the general committee conference, each chairman made a brief presentation of his committee's activity as outlined in the following paragraphs. In introducing the chairmen, G. B. Southward, Mechanization Engineer, American Mining Congress, said: "The Coal Division reports, giving authoritative data on operating methods, are published in the MINING CONGRESS JOURNAL, but the men who make these reports gain more knowledge than those who read them. We therefore invite all of you to join with us; by serving on a committee you and your company can get the fullest advantage of the work that is being done."

COMMITTEE ON MECHANICAL LOADING

The committee, under the chairmanship of S. M. Cassidy, has undertaken a study on plans of supervisory organization. Organization charts from different mines were submitted by several committee members showing how the supervision of the various phases of operation and maintenance are coordinated, and it was decided to assemble a number of additional charts which would serve as a basis for conclusions and recommendations to be formulated later by the committee. These plans are to cover single and multiple shifting and will include underground and surface operation and maintenance. It is realized that different conditions require individual approaches to the supervisory problem, and the committee will take these varying factors into account when submitting their report.

COMMITTEE ON SURFACE PREPARATION

During the past year, this committee, under the chairmanship of T. W. Guy, has submitted several reports on coal sizing, including methods of screen analysis and determination of screening efficiency, which were published in MINING CONGRESS JOURNAL. It was decided that these studies should be continued so as to present additional recommendations on these subjects, and that the preliminary study on coal drying should be amplified by presenting more complete data. It was further decided to inaugurate a study and report on coal crushing, which would include the economy and efficiency of different methods, with particular reference to stoker specifications.

COMMITTEE ON HAULAGE ROADS

A study on service haulage tracks for mobile mechanical loaders was started several months ago, and some preliminary cost data for labor and supplies has been gathered from a number of coal companies in several states. These preliminary figures were taken from monthly mine statements and were presented for the purpose of indicating the general range of the track costs. A more intensive study is necessary to show the factors which determine the service haulage track costs,

and detailed reports covering four mines were submitted to illustrate the type of data required. These reports were approved, and Mr. R. V. Clay, committee chairman, made a special request for the help of the Coal Division members in securing similar information from other mines. In presenting this request, it was stressed that, by assisting the committee, a company would develop data that would be extremely useful for its own operating men.

COMMITTEE ON UNDERGROUND POWER

Under the chairmanship of C. C. Ballard, several studies are being conducted on various phases of underground power transmission. Successful mechanical operation requires adequate voltage at the working faces, and the carrying capacity of feeders and returns was selected some months ago as a basic subject. Two reports have now been submitted and published in the MINING CONGRESS JOURNAL — "Carrying Capacity of D-C Circuits" by A. L. Johnston, and "Characteristic Curves of D-C Conductors" by F. L. Stone. These reports in a series of tables and curves, give complete information on resistance, voltage drop and KW loss for all of the combinations of feeders and returns customarily used in coal mine service, and also include discussions on how the heat generated in the circuits affects the carrying capacity of the power lines. These data are presented in a way clearly understandable to the average mine operator or engineer.

A new subcommittee, under W. F. Roberts, has been formed to make a special study on the wiring systems for conveyor operations; this will include recommendations for feeders, returns, switches, junction boxes and all material necessary for the complete wiring circuit from the main trolley or feeder line to the machines at the working faces.

COMMITTEE ON STREAM CLARIFICATION

A year ago, this committee began its work of assembling factual data on methods used to neutralize or eliminate the discharge of acid mine water into streams and, under the direction of J. W. Woomer, chairman, a total of 26 reports, have been prepared, covering mine water chemistry, sources and effects of acid mine water, methods and results of combating acidity, and mine sealing. These reports have all been approved by the committee members, and at their meeting, it was recommended that additional data be compiled along similar and other lines. It was further recommended that the subcommittee might be set up to make more detailed studies of some special problems.

COMMITTEE ON ROOF SUPPORT

This committee, under the chairmanship of F. G. Smith, is carrying on several studies, and a report on steel and timber roof supports for mine entries was recently completed by a subcommittee with A. R. Joyce as chairman. This shows methods of calculating the strengths of different materials and presents a series of tables giving comparisons of strengths between various sizes and shapes of timber and steel beams. This report was published in MINING CONGRESS JOURNAL, and a large number of reprints have been circulated to the coal industry. A continuation of this general subject, covering concrete columns, is being prepared by Jerome C. White.

A new subcommittee, under the chairmanship of H. B. McNary, has just been organized to study the causes of roof deterioration and to conduct investigations on preventative measures. This investigation will include chemical analyses of roof rock and microscopic examinations of the roof structure, with particular reference to the effect of cleavage planes. These investigations will be made with the cooperation of several coal companies, state geologists, and the United States Bureau of Mines.

A subcommittee, under the chairmanship of A. E. Long, is assembling data on roof breaks and pillar recovery; data sheets have been sent to a number of companies, and this report will be completed as soon as possible.

COMMITTEE ON CONVEYOR MINING

A number of reports covering various phases of conveyor mining, including time studies and daily costs sheets, have been prepared by this committee with T. F. McCarthy as chairman, and a new study on gathering belts is now being started by a subcommittee under Carel Robinson. As a preliminary step, several typical layouts of gathering belt installations have been assembled, and the committe agreed that their report would stress the economics of belts used for underground gathering. Operators and manufacturers will be invited to assist in furnishing data for a research program, which is to include construction specifications, installation methods, maintenance and operating recommendations as to length, speed, capacity and effect of different kinds and sizes of coal.

COMMITTEE ON VENTILATION

Under the chairmanship of Walter E. Housman, this committee has just been organized, and plans for their study were discussed. Various phases of ventilation to be covered by the report were considered, such as: (1) Requirements for mechanized mining; (2) sealing worked out areas; (3) methods for determining ventilation requirements; (4) methods for ventilation surveys and for measuring air velocity; (5) maintenance of air courses; (6) advanced planning for a new mine; (7) regular inspections for locating points of high resistance. The committee recognizes that it will not be possible to start simultaneously on all of these subjects and, in the near future, certain specific phases will be selected for immediate study.

Mine tramroad in eastern Kentucky

WHEELS of Government

● *As Viewed by A. W. Dickinson of the American Mining Congress*

Washington Highlights

NEUTRALITY: American ships now sail wherever needed.

SOCIAL SECURITY TAXES: Treasury proposes increase to 8 percent of payrolls.

NEW REVENUE BILL: Temporarily deferred by House Ways and Means Committee.

ECONOMY MEASURES: Federal officials appearing before Non-Defense Expenditures Committee.

SPAB: Collecting data on needs of industry preparatory to starting allocation system.

PRICE CONTROL: Congress caught between conflicting forces.

DEFENSE STRIKE CONTROL: Presidential sanction for palliative measure.

SOLID FUELS CZAR: Secretary Ickes, as Solid Fuels Coordinator, names Howard Gray Acting Director.

MANGANESE AND CHROME: Metals Reserve states specifications and prices for purchases.

EXPLOSIVES CONTROL: Bill enacted controlling distribution and use of explosives in event of war.

APPROVAL in mid-November of the amendment to the Neutrality Act authorizing the placing of naval and anti-aircraft guns on merchant vessels and the dispatch of these vessels bearing lend-lease supplies and munitions through combat zones, placed the United States squarely in the international conflict. After prolonged and violent debate in the Senate the bill was passed by a vote of 50 to 37. Concurrence of the House in the amendments of the Senate was disturbingly uncertain to the administration, and the final approval by a vote of 212 to 194 was only accomplished after pointed personal appeals from the President and his aides. The contest in the House was so close that representatives in Congress were promised by the administration that labor legislation to curb strikes would have administration approval. This assurance was given in answer to protests that such a definite act of aggression as the amendment to the Neutrality Act would be useless unless accompanied by a curb on strikes which would guarantee a steady flow of munitions production. It is stated that 1,200 merchant vessels will be quickly armed to carry aid to Britain and Russia by Atlantic, Arctic and Asiatic waters, and a more recent move has placed United States troops in Dutch Guiana to guard and guarantee the production of the precious bauxite which furnishes aluminum for our airplanes and other defense equipment.

All these happenings, coupled with the labor situation, the desire for price control legislation and the call for additional taxation, have resulted in keeping a tired and unwilling Congress in Washington. There is still a possibility of adjournment of the present session by December 15, but the proposal to go home for Thanksgiving and stay home until the convening of the second session in January went by the boards.

When the Revenue Bill?

A further request by the President for additional defense appropriations for the Army Air Corps, Army Ordinance, and others, in the amount of $7 billion, resulted early in November in suggestion by the Treasury to the House Committee on Ways and Means that work should be begun on a new tax bill. The Treasury's suggestions of new revenue sources included a 1 percent increase for both employes and employers for old age pensions and a new levy of 1 percent on employes for unemployment compensation; also a proposal for the collection by employers and payment on a quarterly basis of a wage and salary tax of from 10 to 15 percent; which was promptly dubbed a "check-off" tax.

These proposals have not been warmly received either by the personnel of the Ways and Means Committee or by other members of the House. 1942 is an election year and there is a strong and quite natural desire on the part of members of Congress to see what the tax returns on next March 15 will bring before they commit themselves to a tax program which will bear so heavily on the people in their home districts. The Committee on Ways and Means voted "temporarily to defer" the consideration of a further revenue bill.

Chairman Harry Flood Byrd of the Non-Defense Expenditures Committee has received from Treasury Secretary Morgenthau the suggestion that spending may be curtailed on reclamation projects, river and harbor and flood control work, expenditures for public roads, funds for vocational activities, and for the farm program. At Senator Byrd's invitation other Federal officials are appearing before the committee to advise concerning economy. An important contribution to this work was recently made by the late Senator Alva Adams of Colorado who severely criticized the proposed adding of over $7 billion to the previously authorized $58½ billion for various defense outlays. As Chairman of the Senate Appropriations Subcommittee handling defense appropriation bills Senator Adams indicated that he was thoroughly in accord with adequate defense but that this country already

has a "colossal" military establishment and that the quantities of tanks, guns and other equipment we are being asked to provide are far in excess of the needs for American defense. The Senator further said, "There is going to be a tremendous repression of private industry in order to produce these quantities that are not needed." He declared that the addition of another $7 billion could only mean an even great dislocation of private industrial activity with consequently greater repercussions when the private firms were asked to pick up the manufacturing load after the end of the emergency.

Priorities and Allocations

The Supply Priorities and Allocations Board has made definite announcement of a long considered plan to replace the present priorities procedure with a system of materials allocations by industry. This action will not and cannot be carried out immediately, but concentrated efforts of the OPM will from now on trend in this direction and, insofar as possible, allocations practices will govern the distribution of materials in 1942. Careful preparation is now being made of data covering the quantities of raw materials which will be available for distribution and the quantities which have been used and which will be needed by the various defense, indirect defense, and civilian industries.

In the meantime it is planned to keep the work of the mining priorities unit, under the direction of Administrator Wilbur Nelson, closely allied with the Commodities Sections of the Materials Division of OPM. The P-23 Preference Rating Order secured for the manufacturers of mining machinery and equipment by the American Mining Congress will expire automatically November 30 but may be renewed for a further period. It is also contemplated that an amended P-56 order will give to the producers of coal, metals and non-metallics an extendable preference rating of A-3 for the procurement and production of mining machinery and equipment *and repair parts therefor.* The use of the A-3 rating on repair parts is a decided improvement, and, in the future, it is planned that the A-8 rating originally granted under the P-56 order will be used in the case of consumable supplies such as explosives, lubricants, wire rope, etc. This whole program places the mining industry in the best position which it has yet occupied and will be an important aid to the metal and mineral commodities sections of OPM because of the close association provided with Administrator Wilbur Nelson and his able and efficient staff.

Prices and Control

After many weeks of hearings, and a stormy five days of debate and vote-shifting on the floor of the House, the Steagall Price Controll bill was passed on November 28, after being shorn of the greater part of its Administration - desired features. The final vote of 224 to 161 was taken after the measure had been so amended that the Administrator in his actions is subject to the veto, or modification on appeal of his price ceilings and other determinations, by a five-man Board of Review; also the life of the measure, if and when enacted, is limited to June 30, 1943. Ceilings on commodity prices may be fixed by the Administrator provided due consideration is given to prevailing prices during the "base period," which is established as of October 1 to October 15, 1941. Far-reaching restrictions are placed on the stabilization of production and prices through open market buying and selling by Federal Agencies. As to business licensing, restrictions are placed upon the Administrator so that he will be required to seek compliance with his regulations in the court.

The warning voiced by the price Czar of the first World War, Bernard M. Baruch, that control of wages must accompany control of prices has been vigorously resisted by the labor elements and it is certain that this Price Control bill has a very difficult path ahead of it during Senate consideration and at the time, if ever, that it faces final consideration by both Houses.

Strikes and Remedies

Although the showdown in the captive coal mine strike controversy has brought peace for the present in defense production, there is a desire on the part of Senators and Congressmen for legislation to guard against the loss of production by further strikes in

The White House: The national Christmas tree will be placed on the South lawn, as announced by the President last year

defense industries. The bills introduced vary from the Vinson 30-day "cooling off" measure, which has been granted a rule and could be considered any day, to bills by Virginia's representative, Howard W. Smith; Iowa's Senator Herring and New Hampshire's Senator Bridges which would give the National Labor Relations Board and the Conciliation Division of the Department of Labor additional powers, freeze the status of closed and open shops, provide full publicity for the innermost workings of labor unions, compel secret ballots of union members before the calling of strikes, and endeavor to curb generally what is now an admittedly bad situation. Out of the welter of bills now available it is expected that the House Committee on Labor will report a measure giving the National Defense Mediation Board statutory status and providing for "cooling-off" periods, together with arbitration at the discretion of the President.

The bill introduced by Senator Tom Connally of Texas, and now the subject of hearings before the Senate Judiciary Committee would add to the power of the President to take over industrial plants, freeze present open or closed shop agreements and create a three-man board to adjust wages. Any bill which ultimately becomes law will probably partake more of the nature of the measure which is expected to issue from the House Committee on Labor.

Piggee-Pigg-oo

The St. Lawrence Seaway and Power Project advocates have now peeled the expenditure estimates contemplated in the 236 projects under the Omnibus Rivers and Harbors bill down to less than a billion dollars, an extraordinary figure when it is remembered that estimates on the St. Lawrence project alone have run well over a billion dollars. Encouraged by the delay of Congress in adjourning, advocates of the St. Lawrence and other projects in the omnibus "pork-barrel" are threatening to secure House passage in the present session. It is anticipated that an open rule will be granted for House floor consideration and it is known that the able and fearless representative in Congress from Pennsylvania, Francis E. Walter, will lead the opposition to the St. Lawrence proposal and, in fact, to the entire rivers and harbors omnibus measure.

Solid Fuels Coordinator

The path which Dr. Garfield trod as Fuel Administrator in the last World War has now become the highroad of Interior Secretary Harold Ickes. Secretary Ickes, who previously had been placed in charge of petroleum, was named "Solid Fuels Coordinator" early last month by the President. The Secretary has since named Bituminous Coal Division Director Howard A. Gray as Acting Director of Solid Fuels Coordination, and Daniel H. Wheeler has been moved up to Acting Director of the Bituminous Coal Division. The only indication of the President's purpose in appointing a Solid Fuels Coordinator is in his statement that "it becomes increasingly urgent to assure that the supply of solid fuels will be adequate." Senator Maloney of Connecticut, who conducted the investigation on the alleged shortage of gasoline supplies in the eastern part of the United States has asked that his special committee be authorized to investigate the new Ickes activities with reference to the solid fuels. Senator Maloney's state of Connecticut and, in fact, all of the New England states are "fuel conscious" territory and the result of the investigating committee's examination, if made, will be of real interest to coal producers.

Shaker Conveyor Mining

(*Continued from page* 29)

cross-cuts, between the center entry and the outside entry on the room side. In setting them in this position, the duckbills can be placed on the conveyor line, to load out the first cut. This saves hand-shoveling in getting distances from the drive to the face. The coal from the elevating conveyor is discharged directly into the mine car.

Room Pillars Are Slabbed

Cross-cuts between rooms are only driven every 80 ft. The rooms are driven on 33-ft. centers, thus leaving a 13-ft. pillar. The rooms are driven up the full 300 ft., then the pillar is pulled back by the slabbing method. Thus the mining machine starts at the face, and cuts this pillar along the rib until within 60 ft. of the entry; this coal is loaded out with duckbills. As the pillars are only 13 ft. thick, and with an 8-ft. cutter bar, the 4 or 5 ft. of pillar left is sacrificed, and no attempt is made to recover it.

The same cycle of operation is worked at the face, in cutting and loading. Two rows of props are carried up each room. Props are 6 in. or 8 in. in diameter, with a cap piece over the timber, 18 in. x 6 in. x 3 in. Blower fans, with tubing, are used in all operations, the fans being placed in the intake of the air course at all times.

Track System for Room Work Laid Out to Furnish Continuous Car Supply to Conveyors

The track system in working the rooms is practically the same as the track system used in advancing the entries, only the track through the cross-cuts from one entry to another is reversed on one end of the curve. The cars supplied to the unit, in working the rooms, are pulled by the locomotive, instead of being pushed, as in the case of supplies for entry development. The track is in two entries; the locomotive coming in with an empty train on the outside entry pulls the train of cars inbye the track that goes through the cross-cut at a point beyond, or inbye, the loading station. If the train of empty cars is pushed through the cross-cut to the loading point, the locomotive then goes out on the outside entry to another cross-over switch some distance outbye the loading point, crosses over onto the track in the center entry, gets the loaded train on this track and proceeds to the shaft bottom.

In this lay-out there is little or no delay due to lack of empty cars; this item on mechanical loading must be watched very closely, in order to utilize loading units to the fullest extent.

All Safety Precautions Are Taken

The mine is ventilated with a force-fan system. It is classed as a non-gaseous mine, but every precaution for safety is taken. Electric lights are used, and open lights are not permitted underground. Rock dust is employed, and all requirements for safety are very closely adhered to.

PERSONALS

Richard H. Dalrymple of Moab, Utah, has been appointed coal mine inspector for the State of Utah, succeeding **John Taylor.**

Kenneth Fulton, California state director of natural resources, was recently appointed by Governor Olson as emergency coordinator of mines for the state, in accordance with the request of the OPM that each state make such appointments to aid in administration of priority orders.

E. M. Tittman, formerly assistant manager at Salt Lake City for the American Smelting and Refining Company, has been promoted to the position of general manager of the smelter at East Helena, Mont., for the company. **R. A. Bradford** has been transferred from the position at East Helena to become southwestern manager of A. S. & R. at El Paso, Texas; and **J. D. Mackenzie,** formerly manager at El Paso, has become manager at San Francisco. At the same time **Kuno Doerr, Jr.,** assistant superintendent at Garfield, Utah, has been named assistant manager at Salt Lake City; **R. A. Perry,** superintendent of the Murray, Utah, smelter, has become assistant superintendent at Garfield; and **F. J. Downey,** metallurgist of the Garfield smelter, has been made superintendent at Murray.

Harlowe Hardinge, president of Hardinge Co., Inc., at York, Pa., recently returned from a six weeks' trip visiting the mining districts of Manitoba and British Columbia, Spokane, Los Angeles, Las Vegas, Salt Lake City and Butte. While in San Francisco, he attended the convention and exposition of the American Mining Congress. He reports increased mine activity everywhere caused by the war effort.

W. B. Timm, formerly chief of the Bureau of Mines of the Department of Mines and Resources, Ottawa, Canada, has been promoted to the position of Director of the Mines and Geology Branch, the position formerly occupied by **John McLeish.**

G. Moss Patterson, of Pineville, Ky., head of the Kentucky State Department of Mines and Minerals, has been named by Governor Keen Johnson as the State emergency coordinator of mines, to increase coal production in the interest of national defense.

Eugene McAuliffe, president of the Union Pacific Coal Company and Southern Wyoming Utilities Company, with office at Omaha, Nebr., has been elected president of the American Institute of Mining & Metallurgical Engineers for 1942. Since 1908 Mr. McAuliffe has been a coal mining executive for mines in Kentucky, Ohio and the west. During the first World War he was manager of fuel conservation for the U. S. Railroad Administration and immediately after the railroads were returned to private ownership he acted as advisor to the U. S. Coal Commission. For these services and for a distinguished engineering career, he was awarded in 1927 the degree of doctor of engineering by the Missouri School of Mines. His efficient management for mines of the Union Pacific Railroad Company is widely known, and he is equally well known for the manner in which he has promoted safety in the company's mines.

EUGENE McAULIFFE

In the same election, **Chester A. Fulton,** president of the Southern Phosphate Corporation, and **L. E. Young,** consulting engineer, Pittsburgh, Pa., were made vice presidents of the Institute. Directors elected were: **Charles Camsell,** deputy minister of mines, Dominion of Canada; **C. A. Garner,** vice president, Jeddo-Highland and Noble Brook Coal Companies; **William B. Heroy,** vice president and chief geologist, Pilgrim Exploration Company; **Wilber Judson,** vice president, Texas Gulf Sulphur Company; **Leo F. Reinartz,** works manager, American Rolling Mill Company; and **Francis A. Thomson,** president, Montana School of Mines.

George W. Roddewig, who recently returned from Bolivia, where he was manager of a large mine is in Washington, D. C., as a consultant in the zinc section of the OPM.

W. P. Chinn of Duluth, Minn., formerly general manager of Pickands, Mather & Co., was recently honored by a luncheon on the occasion of his 75th birthday. **A. D. Chisholm,** general manager of the company, presided at the luncheon.

Joseph L. Osler will soon terminate affairs of the Blackwood Coal & Coke Company, Blackwood, Va., for which he has been receiver since 1933. Two mines of the company have been leased by the Gibson Fuel Company and their operation will be continued.

Charles Makella, Jonathan Thomas, Nick Butko and **Fred Bugni,** all mine inspectors of Butte, Mont., were suffocated recently when they entered an abandoned shaft of a Butte mine.

E. H. Snyder, general manager of Combined Metals Reduction Company, Stockton, Utah, has been elected president of Combined Metals, Inc., a holding corporation for the company. At the same time **J. C. Jensen** and **George W. Snyder** were named vice presidents and **Guy Snyder** was made secretary.

Raymond S. Smethurst, attorney of Washington, D. C., has been named as counsel of the National Association of Manufacturers and will head the Association's legal staff in Washington.

Walter J. Tuohy, president of Globe Coal Company, Chicago, has been named president of the newly formed Cameo Coal Mining Company, which will take over the Cameo Splint mine of the Cameo Splint Coal Company in West Virginia. **J. Clifford McChristie** of New York City, is secretary and treasurer of the new mining company.

John P. Skinner has joined the staff of the Climax Molybdenum Company at Climax, Colo. He was formerly mine engineer for the London Mines and Milling Company at Alma, Colo.

C. A. Carman has been made mine foreman at No. 4 mine of the Koppers Coal Company, Kimberly, W. Va., after having resigned as instructor in the extension department of the School of Mines, West Virginia University.

John W. Melrose of Olympia, Wash., has been appointed a geologist for the Chicago, Milwaukee and St. Paul Railroad, with headquarters at Spokane. He will make a study of the mineral resources of Montana along the lines of the railroad.

Earle M. Bagley, formerly mill superintendent for the Balatoc Mining Co., in the Philippines, has accepted a position as metallurgist with Mammoth-St. Anthony, Ltd., at Tiger, Ariz.

D. L. McElroy, director of the School of Mines, West Virginia University, has been granted a temporary leave of absence to serve as assistant coordinator for mines of the OPM in Washington. In his new position, he will serve as coordinator for priority matters relating to coal mines.

E. A. Anundsen, formerly district engineer for the U. S. Bureau of Mines in Alabama and Arizona, has been appointed to the staff of Pickands Mather & Co., with office in Duluth, Minn.

L. H. Winger has resigned as instructor in the extension department of the West Virginia University School of Mines and has joined the personnel department of the Island Creek Coal Company at Holden, W. Va.

Russell F. Johnson has become affiliated with the marketing division of Appalachian Coals, Inc. He was formerly sales representative in the Cincinnati and Detroit territory for the Red Jacket Coal Company, and had previously been an engineer and mine foreman at Red Jacket, W. Va.

F. C. Baker has been elected president of the American Potash and Chemical Corporation. Other officers elected at the same time were **Peter Colefax**, vice president; **R. W. Mumford**, vice president and consulting engineer, and **W. J. Murphy**, vice president in charge of sales. **H. S. Emlaw**, retiring as president continues as a director of the company and member of the executive committee.

Frank G. Reed, vice president and general manager of the Crerar Clinch Coal Company, Chicago, has been selected as head of the priorities committee of the American Retail Coal Association, with headquarters in Washington.

General Philip B. Fleming, formerly Wage-Hour Administrator in the Department of Labor and recently appointed head of FWA, has been ill in Walter Reed Hospital in Washington. The Acting Administrator of the Division is now **Baird Snyder, III.**

N. B. Thomsen will be manager, and **E. F. Raeside** will be superintendent of construction, of the flotation-calcination plant which the Southwestern Engineering Company of Los Angeles is designing for Basic Ores, Incorporated, and which is to be built in the Luning district of Nevada, to produce magnesium oxide. When the plant is in operation the product will be shipped to the refining plant of Mangesium Inc., at Las Vegas, Nev.

Thomas C. Cheasley, combustion engineer, Sinclair Coal Company and a member of the staff of the Battelle Institute, was the guest speaker at a meeting of the Chicago Coal Merchants Association Combustion Engineers in late October in Chicago. His subject was the analyses, burning characteristics, and adaptability to various heating and power plant equipment, of Western Kentucky coals.

Edward Thornton has been reelected second vice president and general manager of Summitville Mines, Inc., of Summitville, Colo.

The Inter-State Iron Company, a subsidiary of the Jones & Laughlin Steel Corporation, has announced changes of personnel in the mining department as follows:

Jesse C. Madson, formerly superintendent at the Grant mine, Buhl, Minn., has been transferred as superintendent of the Benson mines at Benson Mines, N. Y.

Paul Kruse, formerly mining engineer at the Hill Annex mine at Calumet, Minn., has been appointed superintendent of the Grant mine at Buhl, Minn.

R. O. Brandon, formerly general foreman at the Hill Annex mine, has been appointed assistant superintendent of that mine under **E. S. Tillinghast**, superintendent.

A. N. Wold, Calumet, research engineer, has been transferred to the Virginia headquarters of the company.

Al J. Myers has been promoted to chief engineer of the Hill Annex mine.

Stephen E. Erickson, mining engineer, from American Cyanamid Co. of Connecticut, and **John Linden**, mining engineer, formerly with the Arthur Iron Mining Co., have been added to the Hill Annex mine engineering department.

John East sailed from Seattle in September for Alaska, where he will head a party of U. S. Bureau of Mines geologists and engineers, exploring for strategic minerals on Yakobi Island.

Fay L. Wright, consulting geologist and petroleum engineer of Los Angeles, has been made general manager of the Utah Magnesium Company, Thompson, Utah, which company was recently formed to develop a large deposit of magnesium chloride in eastern Utah.

James F. Frost was recently appointed manager for the Lehigh Metals Company at Mogollon, N. Mex.

— *Obituaries* —

Livingston Wernecke, vice president and manager, Treadwell Yukon Corporation, Ltd., of San Francisco, was killed on October 21 in the crash of a company plane which was flying from Hyder, Alaska, to Seattle. The plane crashed in a fog on the British Columbia coast, killing both Mr. Wernecke and the pilot.

Mr. Wernecke who had lived in Berkeley, Calif., for the past five years had a long and distinguished career as a mining engineer and geologist. Following graduation from the University of Washington in 1906, he was a surveyor in Alaska, a construction engineer with the Nevada Consolidated Copper Corp., and division engineer with the Copper River and Northwestern Railroad in Alaska. In 1915 he became geologist with the Alaska Treadwell Mine at Juneau; after the war he was superintendent and later manager of the Treadwell Yukon Company, Ltd., at Wernecke in the Yukon territory, and construction geologist of the Alaska Treadwell Gold Mining Company.

Simon Guggenheim, president of the American Smelting & Refining Company, and former U. S. Senator from Colorado, died on November 1 in Mount Sinai Hospital, New York, where he had been ill with pneumonia. He was 73 years old.

Mr. Guggenheim was a leader in industry and finance and one of the nation's outstanding philanthropists. Starting his connection with the American Smelting & Refining Company in 1901, he became president in 1919, when his elder brother, Daniel, retired from business. He had performed outstanding service to the mining industry and had been an outstanding contributor to the cause of education.

Ralph B. Haverstick, treasurer of the Harmon Creek Coal Corp., and of the Industrial Coal & Iron Co., with general offices in Pittsburgh, Pa., died recently at the age of 55 years. He had been associated with the coal industry for more than 35 years.

Justin H. Haynes, superintendent of the Saratoga Mine at Russell Gulch near Central City, Colo., and a widely known Denver mining engineer, died recently in Central City at the age of 60. Mr. Haynes was a graduate of the Colorado School of Mines and had been identified with numerous mining ventures in the state. At one time he was superintendent of the Vindicator mine at Cripple Creek.

William E. Miller, president of the Baker-Whitely Coal Co. of Somerset, Pa., and president of the Somerset County Coal Operators' Association, died on October 22 in Baltimore, after an illness of eight months. He had been president of the coal company since 1929.

Stanley Moore, of Wallace, Idaho, long prominent in mining activities of the Coeur d'Alene district, died October 28 at Helena, Montana, at the age of 63. He was formerly consulting engineer for the Sunshine Mining Co., and more recently was manager for the Standard Silver-Lead Co. at Wilborn, Montana.

William J. Beury, president of the Algoma Coal and Coke Company of West Virginia, died October 24 in Philadelphia, after an operation. He was 64 years old. He had been with the Algoma Company for 43 years and rose to the presidency of the company in 1918.

Douglas Lay, a prominent British Columbia mining engineer, died on November 1 at the age of 63. He was resident engineer for the British Columbia Department of Mines, at Victoria, and formerly had been stationed at Hazleton.

William F. Gray, president of the Jungo Mining Company, died at Reno, Nev., September 25, at the age of 69.

NEWS and VIEWS

Secretary Ickes Controls Coal

In appointing last month Harold Ickes, Secretary of the Interior, as Coordinator for solid fuels, President Roosevelt in a letter noted that Mr. Ickes is already Coordinator of the oil and gas industries; addition of solid fuels, principally coal, to his province makes him virtually the fuel czar of the defense program. In conferring on the Secretary the additional title of "Solid Fuels Coordinator for National Defense," he was instructed to perform duties as follows:

1—Ascertain military and civilian needs for solid fuels.

2—Collect all information relating to development, production, supply, availability, distribution, utilization, transportation and handling of solid fuels.

3—Recommend to the Supply, Priorities and Allocations Board, the Office of Production Management and the Office of Price Administration and any transportation agency measures relating to production, storage, pooling, transportation, distribution, marketing and consumption and designed to maintain adequate supplies at reasonable prices.

4—Encourage efficiency and economy in production and utilization.

5—Recommend to SPAB and OPM all needs of the solid fuels industry connected with maintenance of supply and transportation.

SPAB will continue to have final authority over most of these subjects on which Mr. Ickes is to make recommendation.

West Virginia Institute Meets

The West Virginia Coal Mining Institute held the 34th annual meeting on November 7 and 8 at Morgantown, W. Va. An estimated 200 attended the sessions, at which vital problems of the industry were discussed. The meeting was opened with an address of welcome from W. G. Crichton, president of the Institute, who presided. A symposium followed on "Personnel Training for Coal Mine Employes," at which were presented papers by J. J. Foster, assistant to vice president, Island Creek Coal Company (read by L. H. Winger); D. C. Maurer, assistant division maintenance superintendent, Consolidation Coal Company; G. R. Spindler, assistant director, mining extension, West Virginia University; and F. F. Jorgensen, Fairmont, W. Va. These papers presented the various aspects of mine personnel training for these strenuous times. Following the symposium A. B. Crichton, Jr., superintendent of the Johnstown Coal & Coke Company, Logan No. 4 Mine, Beaverdale, Pa., presented a talk on "Trials, Tribulations and Triumphs in Mechanical Mining." In the afternoon, with T. E. Johnson presiding, papers were given by W. E. E. Koepler, secretary of the Pocahontas Coal Operators Association, Bluefield, on "Reconstruction by Research"; by S. R. Pursglove, of the Pursglove Coal Mining Company, Cleveland, Ohio, on "Rehabilitation of Injured Workmen in the Coal Industry"; followed by J. J. Forbes, chief of the Mine Inspection Division, U. S. Bureau of Mines, speaking on "Federal Inspection of Coal Mines"; and Dr. Wilbur A. Nelson, Administrator of Mine Priorities, in the Office of Production Management, Washington, on the subject of "Priorities for Coal Mines."

In the evening a banquet was held at the Hotel Morgan, at which entertainment was provided by an orchestra, and Frank Gervasi, correspondent for Collier's Magazine, spoke on his experiences. On the following day, Saturday, inspection trips were arranged for those who wished to go to the mines in the vicinity of Morgantown, to the new Mineral Industries Building of the University, and other points of interest. In the afternoon, the football game between West Virginia University and Kansas was a feature attraction for convention-goers.

Officers of the association are W. G. Crichton, president; vice presidents, T. E. Johnson, John Sydnor, Max Forester, Harry Faust, and Joseph Pursglove, Jr. The secretary-treasurer is D. L. McElroy. The committee handling entertainment details for this meeting were Don B. Potter, chairman, assisted by G. B. Blackburn, Joseph Pursglove, Jr., James F. Crockett and G. R. Spindler.

To Buy Copper Above Ceiling Price

As reported last month in these pages, the Procurement Division of the Treasury Department recently signed contracts for the purchase of the entire copper output of the Copper Range Company, Quincy Mining Company and the Isle Royale Copper Company, three of the so-called "high-cost" Michigan producers of the metal. Maximum prices of 15 and 16 cents a pound were approved by the Office of Price Administration for these purchases, in comparison with the 12-cent ceiling which has been fixed for the general copper output.

It is now reported that the Procurement Division agreed to pay a price per pound equivalent to the "out of pocket" cost of the producers for the six months period ended June 30, 1941, adjusted to include a wage increase of $1 a day for each eight-hour shift and expenses incident to the increase. An additional cent a pound will also be paid if the total price per pound is lower than the cost of production during the contract period.

On the other hand, if the "out of pocket" cost per pound is lower during the contract period than the adjusted cost of production for the period from January 1 to June 30, 1941, the price to be paid will be the cost of production during the contract period plus 50 percent of the difference between the periods. This provision is to induce producers to reduce operating costs below those during the first half of 1941.

New Homestake Shaft in Use

The Yates shaft of the Homestake Mining Company at Lead, South Dakota, was placed in production in October. The new shaft, which will replace the Ellison shaft which must be abandoned because of ground subsidence, was started in 1938 and has now been stripped and timbered to the 3,900-ft. level; it will be continued by sinking to the 4,100-ft. level and ultimately to 5,000 feet. The features of the new shaft were fully described in the September, 1940 issue of MINING CONGRESS JOURNAL by Harlan A. Walker, asst. gen. mgr. of the company.

The new surface plant is already completed and in use, including a headframe and crusher building, compressor plant, carpenter shop, hoist building, sub-station and change house. Other surface buildings remain to be completed.

Magnesium Allocated

In mid-November, the Division of Priorities of the OPM in Washington, issued General Preference Order M-2-b, placing magnesium under a rigid allocation control. The metal had been under priority control since March of this year but this new order greatly strengthens and expands the control previously exercised. The order directed that all magnesium and magnesium products, in whatever form or by whomever held, not at present being used to fill defense orders, with ratings of A-1-j or higher, be reported to OPM before November 30, 1941, and be held for sale to a producer or an approved smelter so that the metal will become available for defense uses. The order now provides for complete allocation of all magnesium by the Director of Priorities on a monthly basis.

Metals Reserve Formulates Standard Contracts For Manganese And Chrome Ores

For the benefit and guidance of producers desiring to make offers of low grade manganese and chrome ores, Metals Reserve Company of the RFC has issued a statement describing in detail the specifications, price schedules, conditions of shipment and delivery, sampling and analysis which will be included in standard contracts for the purchase of those ores.

The bulletin says that present purchasing policy of the Metals Reserve Company is subject to change without notice, and the terms and provisions of each contract will be based on conditions and circumstances existing at the time of acceptance.

In regard to manganese ores the terms and provisions are:

1. *Quantity*—Five thousand to ten thousand tons per contract. In cases involving large investment in plant and equipment for beneficiation of ore, contracts may be let for larger tonnages and on such terms as may be deemed appropriate in each case.

2. *Quality*—Purchases of domestic manganese ores under standard contracts will be of three grades, with specifications as shown in Table I.

Size of ore: None which will not pass a 6-inch screen, and not more than 12½ percent of fines which will pass a 20-mesh screen.

Buyer may reject any shipment which does not conform to the requirements and specifications as set forth above.

3. *Price*—Effective November 17, 1941, contracts will be considered on the following schedule for domestic ores, within the continental United States (excluding Alaska); all prices per long ton (2,240 pounds) of dried ore, f.o.b. stockpile designated by the buyer.

High Grade—Base price, $36 per long dry ton for ore containing 48.0 percent manganese with increase of seventy-five cents (75c) per ton for each unit (22.4 pounds) in excess of 48.0 percent; fractions pro rated.

"Low Grade A"—Base price, $28.60 per long dry ton for ore containing 44.0 percent manganese; plus an increase of sixty-five cents (65c) per ton for each unit (22.4 pounds) in excess of 44.0 percent; fractions pro rated.

"Low Grade B"—Base price, $22 per long dry ton for ore containing 40.0 percent manganese plus an increase of fifty-five cents (55c) per ton for each unit (22.4 pounds) in excess of 40.0 percent; fractions pro rated.

An allowance per long dry ton equal to the freight tariff per long ton from the seller's nearest convenient rail station to the buyer's stockpile will be made, in addition to the above prices.

A deduction from the above prices will be made on each contract to cover the approximate cost of sampling, analysis, weighing, and unloading onto the stockpile.

Under the standard contract, each lot will be priced under the grade which specifications it meets. Thus a lot carrying 45 percent manganese but also 0.50 percent phosphorus would be priced as "Low Grade B."

4. *Shipment and Delivery*—Shipment will be made in flat-bottom gondolas in lots of 250 tons, to the stockpile designated by buyer. Seller will deliver the ore on board cars at the place of loading, where the ore will be sampled as loaded into cars. When 250 tons has been loaded into cars and sampled, such cars will be held at point of loading pending receipt by buyer of the results of analysis of the ore. Promptly upon receipt of the analysis, the buyer will advise seller as to whether the ore is acceptable and under what classification, and if so, seller will prepay the freight to stockpile designated by the buyer, where the ore will be weighed in cars, light and loaded, on track scales and sampled for moisture. Any demurrage in connection with the above operations will be for the seller's account.

5. *Payment*—As soon as moisture determination is received, the buyer will promptly pay the seller in accordance with the weight certificate and the above schedule.

6. *Weights*—The weight paid for will be net railroad track scale weights (weight of loaded car less weight of empty car), less moisture as determined by standard practice.

7. *Sampling and Analysis*—Each lot will be sampled at the time of loading into cars by a sampler designated by the buyer, three samples made for seller, buyer and umpire, and analysis made for manganese and other guaranteed elements. Usual provisions will be made for splitting limits and settlement by average of seller's and buyer's analyses, or by trade practice if samples are sent to umpire. Moisture samples will be taken in accordance with standard practice.

8. *Term of Contract*—Deliveries under standard contracts must be completed within 18 months of date of signing of contract. If delivery of 20 percent of the tonnage contracted for has not been made within six months of date of signing the contract, the buyer may cancel the contract forthwith.

The same general program and conditions will be followed on contracts for the purchase of chrome ores as outlined above for manganese ores, except as to quality and price.

1. *Quality*—Purchases of domestic chrome ores under standard contracts will be of two grades, with the specifications as shown in Table II.

2. *Price*—Effective November 17, 1941, contracts will be considered on the following schedule for domestic ores within the continental United States (excluding Alaska); all prices per long ton (2,240 pounds) of dried ore, f.o.b. stockpile designated by the buyer.

High Grade—Base price, $43.20 per long dry ton for ore containing 48.0 percent Cr_2O_3 and with a ratio of chrome (cr) to iron of 3.0 to 1; with an increase or decrease of seventy-five cents (75c) per ton for each unit Cr_2O_3 in excess of or less than 48.0 percent Cr_2O_3 respectively, with a minimum of 45.0 percent Cr_2O_3; with an increase of one dollar eighty cents ($1.80) per ton for each tenth increase in chrome-iron ratio to a maximum of 3.5 to 1 and corresponding decrease of one dollar eighty cents ($1.80) per ton for each tenth decrease in chrome-iron ratio to a minimum of 2.5 to 1. The chrome content of any ore is 68.4 percent of its chromic oxide (Cr_2O_3) content.

Low Grade—Base price, $22 per long dry ton for ore containing 40.0 percent Cr_2O_3; with an increase of fifty-five cents (55c) per ton for each unit in excess of 40.0 percent Cr_2O_3. Requirements as to amount of fines are waived on this one class of material.

Fractions pro rated in all cases.

An allowance per long dry ton equal to the freight tariff per long ton from the seller's nearest convenient rail station to the buyer's stockpile will be made in addition to the above prices.

A deduction from the above prices will be made on each contract to cover the approximate cost of sampling, analysis, weighing, and unloading on to the stockpile.

Requests for information about contracts and offers of sale of manganese and chrome ores should be addressed to Metals Reserve Company, Washington, D. C., and should contain the following information:

1. Name of applicant, with business references, and statement of experience of applicant in connection with mining the above types of ores, other ores or non-metallic products.

2. Description of the mining property from which it is expected to offer

TABLE I

	High Grade (Percent)	"Low Grade A" (Percent)	"Low Grade B" (Percent)
Manganese—Minimum	48.0	44.0	40.0
Alumina—Maximum	6.0	10.0	No Maximum
Iron—Maximum	7.0	10.0	No Maximum
Phosphorus—Maximum	0.18	0.30	0.50
Silica—Maximum	10.0	15.0	No Maximum
Zinc—Maximum	1.0	1.0	1.0

TABLE II

	High Grade (Percent)	Low Grade (Percent)
Chrome (Cr_2O_3)—Minimum	45.0	40.0
Chrome (Cr)—Iron Ratio—Minimum	2.5 to 1	No Minimum
Silica—Maximum	11.0	8.0
Phosphorus—Maximum	0.20	No Maximum
Sulphur—Maximum	0.50	No Maximum

production, with data to show that ore is available, or can probably be made available in quantity to meet the contract requirements.

3. Statement of the tonnage offered for sale, rate of delivery, complete analysis of the ore to be delivered, and the location on railroad from which shipments will be made.

Anthracite Miners Receive Higher Pay

In October, the anthracite miners of eastern Pennsylvania received a 2½ percent increase in pay, in accordance with the agreement entered into last spring between the union and mine operators. When the agreement was negotiated the miners' pay was increased 7½ percent for the period from May 1 to September 30, with an additional increase to go into effect on October 1. The latest increase, it is said, means about $3,500,000 added to the pay roll of the region, and this added jump in wages represents about a 10 percent increase over those rates in effect under the 1923 agreement. The men were also granted a 10-day vacation each year and a token payment of $20 during the Christmas holidays.

Copper for Defense

The OPM recently promulgated Copper Conservation Order M-9-c prohibiting the use of copper and copper base alloy, after January 1, 1942, for many civilian uses, and curtailing the use in many other articles. In explanation the OPM issued a discussion, which gives a clear picture of the situation in regard to our present and future supply of this metal and which therefore is important and timely. Quoting in part:

"Figures for October, 1941, present a striking picture of the demand for copper. Demands from the Army, Navy, Lend-Lease and other defense agencies total 144,430 tons. Total requirements, including civilian, are 259,479 tons. Against that we have a total production for the month from both foreign and domestic ores and scrap of 138,800 tons. The necessity for strict rationing and control of copper is obvious.

"Nor can October be regarded as unusual. Estimates for 1942 bear out the trend. Here they are:

"Supply: 1,650,000 tons, of which approximately 600,000 tons will be made from imported ores, subject to shipping hazards.

"Demand:	Tons
For defense (all military, including Lend-Lease)	1,050,000
For essential civilian uses	250,000
For other civilian	1,100,000
	2,400,000
Indicated shortage	750,000

. . . "The supply is being expanded as much and as rapidly as possible. Every known sizable source of the metal is cooperating with the Office of Production Management in an effort to increase supply and added tonnage for 1942 over previous years is assured. Plant increases are under way in this country and further possibilities of copper are being explored.

"However, the United States is expected to produce more than a million tons of copper in 1942 and an increase of 10 percent would just about exhause our known possibilities.

"We expect to get during the year approximately 600,000 tons of copper from other countries. We import copper from Chile, Peru, Venezuela, Cuba, the Philippines and Canada, with Chile providing 80 percent of our imports.

". . . . However, we are face to face with the fact that a serious copper shortage exists and no certain remedy for it is in sight."

New Great Lakes Ore Boat Contracts

Planned increases in the steel making capacity of the country will call for additional iron ore carrying capacity on the Great Lakes, exceeding that of even this record-breaking year. To provide this capacity the Maritime Commission in Washington, D. C., awarded contracts in October for the construction of 16 Great Lakes iron ore carriers. The vessels are similar in size, will cost about $1,875,000 each and are to be completed early in the spring of 1943. Six of the new ore carriers will be built by the Great Lakes Engineering Works at their River Rouge yards, and four of them will be built at the company's Ashtabula, Ohio, yard. The American Ship Building Company was awarded contracts for the other six, four of which will be built at Lorain. Ohio, and the other two at Cleveland.

The new ore carriers are to be of standard steel construction, 595 ft. long, 60 ft. beam and 35 ft. in moulded depth. Each will have a carrying capacity of 12,000 deadweight tons.

Coal for River Shipment Increased In Price

The Bituminous Coal Division of the Department of the Interior has ordered an increase of 7½ cents per ton in the minimum mine prices of coal for "ex-river" shipments from mines in Western Pennsylvania and Northern West Virginia (Districts 2, 3 and 6), via river terminals at Colona and Conway, Pa., to Eastern Ohio markets. From evidence presented at a public hearing the Division had found that this minimum price increase was necessary under the Coal Act, in order to permit producers to ship "all-rail" to compete with "ex-river" shippers, despite a 7½-cent per ton reduction in transportation charges for the "ex-river" shipment. The Division's order stated that evidence did not indicate the consumers would be injured by the minimum price increase.

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Annual Meeting Industrial Hygiene Foundation In Pittsburgh

The Industrial Hygiene Foundation of America, Inc., which recently changed its corporate's name from the Air Hygiene Foundation in order more clearly to reflect its duties in industry, held on November 12 and 13 the sixth annual meeting at the Mellon Institute in Pittsburgh, Pa. At each of the sessions on these two days a number of papers were presented covering phases of work in industrial health. The subjects of Sick Absences in Industry and the Cost of Absenteeism were discussed by Dr. W. M. Gafafer, chief of the statistical unit, U. S. Public Health Service, and Andrew Fletcher, vice president of the St. Joseph Lead Company, respectively. Dr. A. J. Lanza, chairman, and assistant medical director of the Metropolitan Life Insurance Company, discussed Medical Developments and Trends in Industrial Health, and he also took part with Dr. D. W. Crombie and Dr. J. L. Blaisdell, both of the Queen Alexandra Sanatarium, Ontario, in the presentation of the subject Aluminum Powder as a Possible Preventive in Silicosis—Present Status of Experimental Work. Tuberculosis in Industry was discussed by Dr. L. U. Gardner, director of the Saranac Laboratory, and T. C. Waters, the Foundation's general counsel, covered the subject of Trends Toward Compensation for Tuberculosis as an Industrial Disease, followed by Dr. E. P. Pendergrass of the University of Pennsylvania, with the subject Large X-ray Film, Paper or Miniature Films—Which for Industry? The Employability of the Physically Handicapped was discussed by Dr. H. H. Kessler, director of the New Jersey State Rehabilitation Commission, and M. M. Walter, Director of the Pennsylvania State Bureau of Rehabilitation. The last paper of the day was that on Findings from Major Studies of Fatigue by Dr. R. R. Sayers, director of the U. S. Bureau of Mines, who also discussed the Administration of the Mine Inspection Act.

On the second day, Dr. George Baehr, chief medical officer of the Office of Civilian Defense, presented a talk on Protection of Civilians and Industry in Wartime, followed by J. Dewey Dorsett of the Association of Casualty and Surety Executives on Legal Trends and New Legislation Respecting Occupational Disease. Professor Philip Drinker of the Harvard School of Public Health presented the report of the Foundation Engineering Committee, under the subject What's New in Industrial Health—Engineering Developments and Trends, followed by Warren A. Cook, past president of the American Industrial Hygiene Association, with the subject Industrial Hygiene at Work in Defense Industries. An Evaluation of Present Exhaust Ventilation for the Control of Health Hazards was given by Professor T. F. Hatch of the University of Pennsylvania, and Dr. D. P. Morgan of the chemicals and allied products branch, of the Office of Production Management, discussed Impact of Chemical Priorities on Industry, followed by Dr. G. D. Beal, assistant director of the Mellon Institute, with the subject A Safe Substitute for Mercury in Certain Industries. The session was closed by Dr. R. R. Jones, medical officer of the Bell Telephone Company, discussing Health Protection for Top Supervisors, followed by a discussion of The Role of Employe Health in Industrial Relations by V. P. Ahearn, executive secretary of the National Industrial Sand Association, and Robert J. Watt, international representative of the American Federation of Labor.

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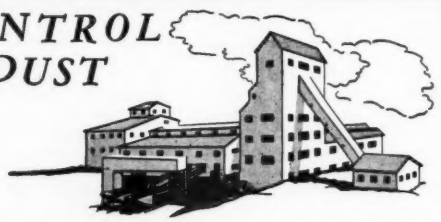

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Study of Changes In Mine Roofs

Report of a study on "Effective Changes in Moisture and Temperature on Mine Roofs" on strata overlying the Pittsburgh coal bed, by Irving Hartman and H. P. Greenwald, was recently made by the U. S. Bureau of Mines. The investigation preceding the report indicates that falls of rock resulting from the disintegration of exposed rock strata in the roofs of coal mine entries, which has always been a serious accident hazard as well as an economic burden, are due primarily to changes in the humidity of the air entering the mine.

Tests made on draw slate immediately overlying the coal, which was taken from the Bureau's experimental mine, at Bruceton, Pa., show that changes in temperature of the order common in most coal mines have very little effect on the rock in the roof, but that changes in humidity create considerable stresses and strains which cause the rock to break up and fall.

During the cold winter months, the experimenters state, these rocks dry out in the mine roof. With the advent of spring and summer weather, warm humid air enters the mine, moisture is deposited on the rocks and causes the clay constituents thereof to swell, thereby weakening and disintegrating them.

Coals, on the other hand, are hardly affected by ordinary variations in humidity but are subjected to somewhat greater stresses than shale rock by changes in temperature. It is unlikely, however, that the ordinary temperature changes encountered in most mines could lead to mechanical failure of coal strata.

The study was undertaken not only to determine the causes of rock behavior in mines, but also to develop, if possible, means for reducing rock falls caused by changes in weather conditions. It has thus far been determined that sealing the roof surfaces with coal-tar base paints or with gunite is helpful, and investigations are being made of the possibilities of air-conditioning in mines as a preventive measure. Experiments also will be conducted on rock strata in mines other than the Bruceton mine and of a nature other than those generally found overlying the Pittsburgh coal bed.

Henderson Views Price Control

While, at this writing, Congress is still debating the merits and demerits of various forms of price control legislation, the views of Leon Henderson, Administrator of the Office of Price Administration, are very interesting as showing the trend of thinking on the part of the one who will administer such price control.

Mr. Henderson recently stated in a radio speech, in part:

"How can we stop rising prices? My answer is simple and direct: First, pass the Emergency Price Control Bill which is now before Congress. But let's pass it quickly, and stop this seemingly endless debate over details. When Congress first started to consider this bill early in August the cost of living had gone up only about 5 percent since the outbreak of the war in September, 1939. By September 15 of this year the advance was almost 10 percent and it has continued to move upward in recent weeks.

"After Congress passes the price control bill, other actions are required, since price control alone is not a cure-all. It must be firmly buttressed by strong fiscal and monetary policies. But even if Congress could or would adopt more drastic tax and credit controls, which you and I and our Congressional guest all know is unlikely, we could not prevent inflation without clear legislative authority for the direct control of prices.

"We can't afford at this time to deceive ourselves about inflation. It is a threat, an immediately present threat, to our security, to our democracy, to our survival as a great economic power. The people of this country understand that. Because they do, they are willing to accept legislation authorizing the Government to control prices. I know that, because I have seen their willingness to accept and their endorsement of voluntary price control measures. My best advice is, therefore—more action and less talk.

"To avoid inflation we must not only have public acceptance of price control legislation, but the legislation itself must provide penalties to combat chiseling and authorize methods of control to meet the situation we face—and not the situation that some other country faces. The mechanics of controlling prices is a pretty technical matter. And there are naturally differences of opinion as to how the job should be done.

"But there are not as many choices as we are sometimes led to believe. Differences of opinion center around relatively few issues. We can't succeed if the measures are too narrow. That's why I believe Senator Taft's idea will not work. He has introduced a bill which in substance requires an elaborate hearing before a price can be fixed. The Bituminous Coal Division had that kind of hearing—and it took them two years to fix minimum prices on bituminous coal. We can't administer an emergency price control law on a business-as-usual basis. Hitler won't wait.

"Nor will our efforts be successful if we undertake to do too much. That's why I think Congressman Gore's plan would bog down—just like N.R.A. He and I agree as to the objective and the necessity for quick action, but he wants to freeze all wages. He wants to freeze all rents. He wants to freeze all prices. He wants to do this in a country as big as ours, where individual rents and wages and prices run into the tens of millions. I don't think that can be done; at least, I don't think that can be done, or should be done in this country, now.

"I stand between these extremes. I'm looking for a workable, practical plan.

"I have been living with the problem of price control day and night since the beginning of the defense program. In my opinion the bill which is now before Congress is adequate for the job that has to be done, and administratively, it's workable. I know it isn't perfect—but the real issue is whether we control prices or whether we don't. The stakes are far too high to fool ourselves about it. Out of my long experience with price, I could suggest several ways of amending the bill to permit a quicker and perhaps more effective measure of price control. But in my opinion such changes would be unwise.

"The bill could be amended to make the job of administering it easier—at a cost. For instance, some of the many standards which the administrator must take into account in fixing prices could be eliminated—standards which he must follow as long as the law remains on the books and there are prices to be fixed. But I believe those standards, though administratively burdensome, are essential to the preservation of the free enterprise system which we are all fighting to maintain."

Sanitary Board Considers Stream Pollution

The Pennsylvania State Sanitary Board, with acting Secretary A. H. Stewart presiding, met in late October with anthracite coal producers whose operations are located on the headwaters of the Schuylkill River. The purpose of the meeting was to consider complaints that pollution of the stream was due to operations of the companies. After a discussion which demonstrated to the board that the anthracite mines were not the source of pollution, the meeting adjourned with a motion to the effect that a committee of three operators, and one representative from the Pennsylvania State Department of Mines, be appointed to make further studies of the situation and report back to the State Sanitary Water Board.

New Ozark Mill

A new 100-ton zinc concentration plant has been completed and placed in operation by the Monarch Mining Company at a zinc property recently opened up by the company seven miles south of Ozark, Mo. The mill is of the Joplin type and equipment includes an 18-in. crusher, rolls, two jigs and three sludge tables.

Festival Celebrates Preeminence of Coal

The preeminence of coal as a factor in the industrial life of Franklin County, Illinois, was celebrated in a three-day festival in West Frankfort in mid-October. Civic and business interests cooperated to dramatize the legend of the coal industry. The program featured booths and displays; a children's parade with pets was held, as well as a beard-growing contest and a beauty contest with the selection of the Queen of Coal and Princess Flame. A parade with floats depicted mythical characters in the legend of Old King Coal, which was the theme of the entire festival. A Queen of Coal was selected, as well as the Franklin County miner who had worked the greatest number of years in coal mines, who was crowned Old King Coal at the open air pageant. A reception for the King and Queen concluded the three-day festival. Displays exhibiting coal, its by-products, and mine machinery lined the main street of the city's business district during the three days.

Church Mine Resumes

The famous old Church mine, three miles south of El Dorado, Calif., on the Mother Lode, is being rehabilitated under the supervision of W. J. Loring, consulting engineer for the Madre de Oro Mines Company, which controls the mine. The workings have been reopened to a point 130 feet below the 1,200-foot level, and it is said that large reserves of ore are now available for extraction. A steel headframe 80 ft. high has been erected and an electric hoist and compressor are being installed. Milling is scheduled to begin before the end of the year.

New Breakers Placed In Operation

The Kohinoor Coal Company at West Shenandoah, Pa., has placed in operation a new breaker costing $200,000. The breaker will be used in connection with the reclamation of culm at the same time that large stripping and deep mining activities are started.

At the Hazleton No. 4 shaft the Lehigh Valley Coal Company has started construction at the Hazleton No. 40 shaft of a modern steel breaker, equipped with the latest coal cleaning devices. It is reported that the breaker will have a capacity of 2,500 tons for a seven-hour shift.

Wyoming Iron Deposit Studied

R. A. Diemer of the University of Wyoming, and other geologists of the state, have been studying the large iron ore deposit near Iron Mountain, Wyo. It is said that the deposit is one of the largest in the country but is not in a form easily convertible to use. Commercial exploitation of the deposit will probably have to await the development of a suitable process.

Russia's Eastern Industrial Reserve

With Russia faced with the probable necessity of retreating behind the Ural Mountains, and having already lost a goodly portion of her industrial production capacity to Germany, the question immediately arises as to Russia's mineral reserves and capacity to produce in the territory east of the Urals. A correspondent of the *Soviet War News* in Sverdlovsk reported on this matter in September. He said that about 87 percent of the lead, most of the zinc and nickel and nearly 96.5 percent of the copper extracted in Russia are obtained in the Urals and the adjacent Kazakhstan district.

The bulk of the country's gold, platinum, tin, tungsten, antimony, and other rare metals are mined in the Soviet East.

Here, also, large aluminum and sulphur industries have been established; magnesium is also produced. All asbestos and potassium consumed in the U. S. S. R. comes from the Urals.

The Urals today are the center of the eastern iron and steel base of the Soviet Union. Whereas in 1929 a total of 8,000,000 tons of iron-ore was produced in the country, by the end of the second five-year plan in 1937 as much as 8,200,000 tons were mined in the Soviet East alone. The succeeding four years of the third five-year plan saw the rapid growth in the extraction of iron-ore in the eastern regions of the country.

The prospected iron-ore reserves in the Soviet East are sufficient to answer the needs of the entire national economy. Untold riches are contained in the Magnitnaya Mountain—the mountain of iron. The iron-ores from the Bakal deposits are in no way inferior to the Swedish ores, claimed to be the best in the world, while those from the Khalilovo deposits, which contain, in addition, a number of valuable metals such as chromium, nickel, and titanium, are comparable only with the iron-ores obtained in Cuba. The Vysokaya and Clagodat Mountains also contain big reserves of high quality iron-ores.

Ten years ago it was generally believed that the section of western Siberia adjoining the Urals was without deposits. Soviet geologists, however, have proved the contrary, namely, that the Gornaya Shoria district, Novosibirsk region, contains huge deposits of ore. They have shown that the Siberian iron and steel industry, which hitherto used Ural ores, can now work with its own deposits.

In the Urals the ore lies right on the surface, so that it is quite a simple matter to increase the output without expenditure of time and funds for deep shafts. The large plants of the Urals, the bulk of which have been built in the past 10 years, are scattered over a vast area from the polar north to the sun-parched steppes in the south. Chief among them are the Magnitogorsk and Stalinsk plants, which rank among the world's biggest iron and steel works.

In 1937, the last year of the second five-year plan, the Soviet East (Urals, Siberia, and Volga region) produced 6,300,000 tons of steel. This is more than the total output of the country at the end of the first five-year plan. During the third five-year plan a number of new industrial giants have been put into operation. Among them are the Nishni Tagil Works, which supplies all the steel requirements of eastern Siberia. A plant producing ferro-alloys, the largest in the country, has been erected south of the Urals. The Urals plants—some newly built and others fundamentally reconstructed—occupy an important place in the output of high-grade steel for all branches of national economy.

The workers and managers in the iron and steep enterprises reported that new production had been scored since the outbreak of war. The output of Magnitogorsk ore has increased nearly 1½ times. A greatly extended eight months' plan was fulfilled five days before schedule.

Large deposits of coal, sufficient to answer the requirements of this giant iron and steel industry, are also to be found in the Soviet East. The mines of the Kuznetsk coal fields in western Siberia produce fine coking coals. Output is rapidly increasing in the Soviet Union's third largest coal center, established a decade ago in Karaganda, Central Asia. A recently built railway line from Akmolinsk to Karataly provides a direct route for Karaganda coal to the southern Urals. The Urals are thus assured ample supplies of coking coals for the rapid development of their iron and steel industries. The output of coal in the Soviet East had already reached 41,000,000 tons in 1937. This was more than the country's total output in 1929 and almost as much as was produced in the Donetz Basin in 1933.

Besides iron, steel, and coal, the eastern part of the U. S. S. R. also has its own oil industry. The new oil fields in Bashkiria and Kazakhstan, in the Molotov, Sverdlovsk, and Kuibyshev regions, and in many other districts, are producing larger and larger quantities of oil. Even in 1938 these new oil fields gave 5,500,000 tons of oil, which is nearly three times the total output of synthetic oil in Germany and larger than the output of Iraq.

Federal Mining Is Sinking Shaft

A new shaft is being sunk by the Federal Mining and Smelting Company between the company's Granby-American mill and Crabapple mine, in the Tri-State district. The shaft will be sunk 50 ft. to where drilling has disclosed lead ore; it will be known as the Lead shaft. It may later be sunk deeper to a zinc ore horizon which the drill shows as underlying the lead deposit.

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Nevada Strike Ends

Nevada's first defense strike, at the Rio Tinto copper mine near Mountain City, Nevada, ended after one week when the CIO mine, Mill & Smelter Workers accepted a proposal urged by Governor Carville, and returned to work. Union officials signed a contract to run until June 30, 1942. Governor Carville had suggested that the men return to work on the basis of negotiations which had been held in Salt Lake City a week previously. The contract is reported to give 75 cents per day increase with paid vacations and other concessions.

Federal Control of Explosives

In mid-November the Senate unanimously passed a House-approved bill to control the manufacture and use of explosives. The bill originally was intended to permit the President to impose wartime controls, similar to those in effect during the last war, on the manufacture, possession and storage of explosives whenever he declared a state of national emergency to exist. However, the Senate adopted an amendment which would delay the effective date of this new measure until Congress has declared a state of war. The bill authorizes the President to require licenses of all persons engaged in the manufacture, distribution and storage of explosives. The provisions would extend to mines and miners using explosives in daily operations.

Alaska Chromite To Be Produced

A company was recently formed by Kenneth E. Hamblen of Portland, Ore., to mine the chromite deposits of Red Mountain on the Kenai Peninsula, Alaska. A crew of men has been at work constructing a road from the head of Jackloff Bay, a part of Cook Inlet, for a distance of 8 miles up the side of the mountain to an elevation of 1,900 ft. From this point an aerial tramway will be constructed to the mine site at an elevation of 8,900 ft. A concentrating plant and loading dock will be constructed at sea level, and the mine opened up by tunnel.

Silver a Substitute for Copper

At the recent annual meeting of the American Society of Chemical Engineers, Robert E. McConnell, chairman of the recently organized Engineers Defense Board, predicted that the Government may have to use some of its hoarded silver supplies as a substitute for copper in electrical conductors. For this use, he said, silver would be substantially as safe as in vaults. Estimating the demand for copper conductors in aluminum and magnesium plants alone at 75,000 tons, he added that the Government might have to dip into its 100,000-ton pile of silver to meet the requirements. For some non-electrical uses of copper, he reported that it may be possible to substitute steel, glass, plastics, wood and fabric.

Pittsburgh Institute Discusses Safety

The Pittsburgh Coal Mining Institute held its first meeting of the season at the Mellon Institute Anditorium in Pittsburgh, Pa., on October 17, with an attendance of about 250. Mine safety was the theme of the meeting, which was presided over by James D. Walker, inspector for the third Pennsylvania bituminous district, and president of the Institute. Reese H. Nicholas, chief mine inspector of the Pittsburgh Coal Company, discussed safety without increased cost, and George W. Grove, mining engineer of the U. S. Bureau of Mines, gave a history of the explosion at the Kent No. 2 mine at McIntyre, Pa., last summer.

New Coal Plants In Kentucky and West Virginia

The Elkhorn Coal Corporation at Wayland, Ky., has contracted with Roberts and Schaefer Company, Chicago, for the erection of a Stump pneumatic coal cleaning plant to be built in their existing tipple. The capacity will be 80 tons per hour for handling ¼-in. by 48-mesh raw coal, and is to be completed by February 1, 1942.

The Page Coal & Coke Company, Pageton, W. Va., has also contracted with Roberts and Schaefer for a complete screening and crushing plant to handle 6-in. by ⅝-in. coal at 250 tons per hour; the plant to be completed by the end of this year.

Magnesium Plant in Operation

The magnesium production plant of the Permanente Corporation, situated at Los Altos, Calif., was recently placed in operation and plans are already being made for an expansion of production facilities.

The production at present is obtained from magnesium oxide which comes from chemical companies, but the company is preparing to produce its own magnesium oxide from deposits of magnesite in Nevada. Tests are also under way of possible other sites for raw materials, including the dolomite deposit in the Cienega district in San Benito County, California. At the latter place test holes are being put down and prospecting is being actively carried on to determine the extent of the deposit.

Percentage Depletion

(*Continued from page* 47)

percentage depletion purposes as would be the case if a field price could be established for the crude product. Moreover, the taxpayer is penalized to an increasing degree as the ratio of operating profit to gross income increases.

Taxpayers May Be Able to Minimize Adverse Factors

Under the existing regulations, the question is whether the taxpayer might be able to minimize the factors that affect adversely the determination of gross income for percentage depletion. It is quite possible to accomplish something in one of two ways, or both. First, the allowable and non-allowable costs, as defined by the regulations, can be reviewed to determine whether charges are being made to the proper classifications, or perhaps certain administrative and overhead expenses can be considered properly as allowable costs. And, second, the taxpayer may be able to compile data which would serve to convince the Revenue Department that its prescribed method of determining gross income is not equitable to the taxpayer.

NOTE: Additional discussions of these problems were made at San Francisco by H. B. Fernald, Chairman of the session; Donald A. Callahan, president, Lexington Mining Company; Charles F. Willis, secretary, Arizona Small Mine Operators Association; A. G. Mackenzie, secretary, Utah Chapter, American Mining Congress; John A. Burgess, general manager, Carson Hill Gold Mining Corp.; Granville S. Borden, attorney-at-law, San Francisco; and F. D. Willoughby, president and general manager, Midnight Mining Company. Lack of space prevents publication of these interesting discussions in full.

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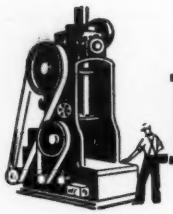
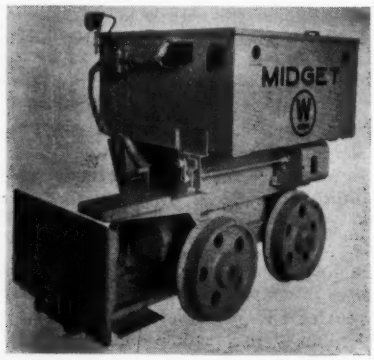


MANUFACTURERS' Forum

New Battery-Operated Locomotive For Mines

For use in coal, metal, and nonmetallic mines, a new storage battery tramming locomotive is announced by Westinghouse Electric and Manufacturing Company.

Known as the Midget and weighing only 1.5 tons, the locomotive is operated by a 5-horsepower, 40-volt d-c traction motor. Continuous motor rating is 770 r.p.m., 55 amperes, 40 volts with a gear ratio of 11⅔:1. Chassis is of heavy one piece cast steel construction. Frame is spring suspended for cushioning of road shocks.



Locomotive brake is of the band type operating directly on a drum mounted on an extension of the worm gear shaft. The drum fit on the shaft is of the tapered type for easy removal. Brake operation is by a handle set at an angle to permit maximum braking with the least effort. A ratchet holds the brake in fixed position when necessary.

A three-position controller is arranged for series parallel control of the motor fields in either direction. The first position connects a resistance in series with the motor with fields in series. The second position short circuits the resistance and the third connects the motor fields in parallel.

Synthetic Rubber Has Many Uses

To fill requirements of a wide range of applications where oil, grease or other solvents which deteriorate natural rubber rapidly are present, The B. F. Goodrich Company, Akron, Ohio, announces a new sponge rubber made from its synthetic rubber, Ameripol. Exhaustive tests have proved that Ameripol has extraordinary resistance to oils, greases and many other solvents, as well as a higher degree of temperature than natural rubber.

The new Ameripol synthetic sponge rubber is in the same manufacturing classification as milled sponge made from natural rubber. Sodium bicarbonate or a similar blowing agent is turned into gas by the heat of vulcanization and thus produces a cellular structure.

Reduction Crushers

The Allis-Chalmers Type "R" Reduction Crusher with Speed-Set Product Control is the subject of a new 16-page bulletin released by the Allis-Chalmers Manufacturing Company, Milwaukee, Wis. Contributing to the description of the crusher are numerous sectional views and actual installation photographs. The Type "R" is now available in four sizes, to handle from 10 to 273 tons per hour.

Mine Telephone Cable

A new mine telephone cable with the mechanical and electrical strength of large cables but a diameter of slightly over ¼-inch has been announced by the General Electric Company. This twisted-pair, No. 14 Awg solid cable is designed for mine telephone service where induced currents and cross talk must be reduced to the minimum.

Versatol insulation makes the cable heat- and moisture-resistant. A tellurium-compounded rubber jacket insures protection against mine waters and soil acids. Breakage is reduced by use of hard-drawn tinned-copper conductors, with one conductor ribbed for easy identification.

The new cable can be run through water without ill effects, can be hung on pegs, or buried in the ground. Its light weight (80 lbs. per 1,000 ft.) makes it easy to transport to any desired location.

Importance Of Arc Welding Symbolized By New Stamp

The tremendous part arc welding is playing in the war effort of the Union of South Africa has been recognized by the issuance of a special postage stamp. This indicates that the Union is not lagging behind other countries in the use of this technique in the construction of her ships, tanks, aircraft and similar equipment.

The photograph, supplied by The Lincoln Electric Company, Cleveland, shows two of the stamps which are of 6d value. Each stamp is printed both in English, as shown on the right, or Afrikaans, as on the left. This is the case with all stamps issued in South Africa.

Lincoln Electric officials say that as far as they know, this is the first time that such a stamp has been issued in the history of either stamps or welding.

Drillers Handbook Issued

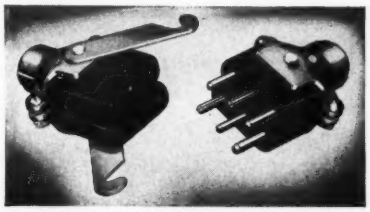
The Cleveland Rock Drill Company has just published a compact handbook for drillers. The Driller's Handbook was designed and written to offer to rock drill operators some practical suggestions on the care and maintenance of air tools, and on the ways and means of getting out of the machines the maximum of delivered work—of footage per shift.

The various types of drills are illustrated and discussed at readable length. Valve diagrams are shown, and the action is explained. Accessories are mentioned and their uses explained. The book terminates with practical suggestions for saving money on repairs, and provides a section for recording costs of drill maintenance.

New 6-Conductor Trailing Cable Plug

The Ohio Brass Company, Mansfield, Ohio, announces development of a new 6-conductor Mechano-Plug for effecting trailing cable connections. Designed especially for making connections to reversible motors, the terminals of the new Mechano-Plug accommodate No. 6 and smaller sizes of wire.

The new Mechano-Plug, as its name implies, is a mechanically assembled and installed plug. Eliminating vulcanizing or unsightly and dangerous cable splices, it can be installed in the field with the simplest tools.



Male and female plug bodies cannot be connected improperly because the non-corrosive, spring bronze terminal plugs and sockets are so arranged as to prevent improper polarity in making connections. A color key simplifies proper polarity hookup at the time of installation.

The plug body is of rubber, which provides ample insulation against electric shock. Moisture and dust-proof joints insure a positive, leak-proof electrical connection.

The 6-conductor Mechano-Plug is designed for currents of 80 amperes, voltages from 250 to 600 d-c.

Welding Book Describes Processes

Clarifying the proper welding process for a particular metal under various circumstances, a 55-page book, "Welding Procedures," has just been published by Air Reduction Sales Company, New York City.

The book recommends the best filler metals to be used for each process and metal, and describes specialized welding techniques not commonly known. In an appendix, data are given for the calculation of electrode and gas welding rod consumption for different types of welds; also comparative welding record sheets for tabulating data that will determine the best welding method for a particular job.

New Acid Mask

Complete head and neck protection for workers handling acid and other dangerous solutions is provided by the Acid Mask made by E. D. Bullard Company, San Francisco. The shatterproof laminated goggles fit snugly around the eye cavities so that the hood cannot slip or turn. This feature assures good vision when the head is turned in any position.

The live rubber goggle mounting is provided with inbuilt air vents of the indirect type that prevents splattering liquids from entering, yet keeps lenses from fogging under normal working conditions.

Form-fitting shoulders offer full neck and chest protection. There is ample impregnated cloth in the Bullard Acid Mask to tuck into other clothing, so that all vital parts of the body are protected. Seams are double stitched—then rubber cemented to add longer wear.

Chicago Pneumatic Enlarged

The Chicago Pneumatic Tool Company recently announced plans for an immediate expansion of its plant at Franklin, Pa., by the addition of a new one-story unit 120 by 534 feet in size, together with extension of the foundry department. The capacity of the Franklin plant will thus be increased by 25 percent, practically all the activities of which are devoted to defense operations.

CATALOGS AND BULLETINS

• CHEMICALS FOR COAL TREATMENT. *Solvay Sales Corporation*, New York City. A pocket-size booklet of 8 pages describing Procite and its uses. Procite is a patented compound to be applied to coal, to reduce difficulties encountered in burning certain types of coal. Used with high-sulphur low-fusion-point coals, the compound reduces clinkering and tube slagging, cuts corrosion in the furnace, corrects coke spars and has other advantages.

• CLAMSHELL BUCKETS. *Blaw-Knox Company*, Pittsburgh, Pa. A comprehensive 36-page catalog on the company's series of two-line lever-arm clamshell buckets. A total of 242 individual bucket specifications are involved, with capacities ranging from 1/3 to 7½ cubic yards. Useful data on counterweights, equalizer bars, and bucket teeth are included. Catalog No. 1757.

• DIESEL ENGINES. *Chicago Pneumatic Tool Co.*, 6 E. 45th St., New York City. Bulletin 764 describes a new CP Type 16 diesel engine. The engines are convertible—diesel to gas and gas to diesel—and various models have horsepowers of 375 to 1,000.

• INDUCTION MOTORS. *Allis-Chalmers Mfg. Co.*, Milwaukee, Wis. Description of the latest Allis-Chalmers induction motor construction for bracket and pedestal types of 250 hp. and larger, and chart showing range of each type, are included in a new bulletin (B-6132) issued by the Allis-Chalmers Mfg. Co. The bulletin not only covers standard motors but those of special protective features such as drip-proof, splash-proof and enclosed designs. It includes tables giving general characteristics, and curves showing variations of power factors and starting torques with different motor rated speeds. Several pages are devoted to induction motor control.

• MUCKING SHOVELS. *Goodman Mfg. Co.*, Chicago, Ill. Bulletin L-401 on company's complete line of Conway mucking shovels that will handle widely different materials in tunnel work. 15 pages.

• PREFABRICATED CULVERTS. *Koppers Company, Wood Preserving Div.*, Pittsburgh, Pa. Booklet on "Pressure-Creosoted Laminex Culverts" (Form G-16) gives their advantages and use for railroads, highways, airport drainage, conduit for pipe lines, waste and storm sewers. 7 pages.

• PUMPS. *Worthington Pump and Machinery Corp., Harrison, N. J.* Bulletin W-325-B1 describes single-stage condensate pumps type JZ for hotwell, condensate, chilled water and general service. 4 pages.

Denver Equipment Co., Denver, Colo. Bulletin P8-B. An 8-page catalog insert describing features of the Denver adjustable-stroke diaphragm pumps.

• POWER SHOVEL AND DRAGLINE PARTS. *American Manganese Steel Division of The American Brake Shoe & Foundry Company*, Chicago Heights, Ill. 24-page bulletin No. 641-D, describes and illustrates design changes of the Amsco renewable lip dipper, standard present-day models and some special types of dippers; as well as dipper teeth, lips, fronts, backs, doors and other parts designed to meet specific digging conditions.

A separate 8-page bulletin, No. 641-S, gives complete details on power shovel and dragline parts of genuine 13 percent manganese steel. Parts such as dipper stick racks and pinions, boom sheaves, crawler idlers, rollers, tumblers and treads for power shovels, etc., are shown, as well as other parts that are subjected to abrasive wear or impact in heavy duty service.

Copies of these bulletins are available on request.

• RUBBER TRANSMISSION BELTS. *The B. F. Goodrich Co.*, Akron, Ohio. Catalog Section 2150 has just been published by the company under the title "Selection and Maintenance of Rubber Transmission Belts." This publication answers such questions as what type, grade, width, thickness, horsepower capacity of rubber belting is needed for various application. It also describes corrections of horsepower rating and gives the importance of bearing capacity in applying rubber belts, belt joints, and endless belts. Included are the latest results of experience in maintenance of flat rubber belting on such points as belt dressing, cleaning, storing, static, oil, and salvage, with definite suggestions for maintaining belt records. Copies are available upon request to the manufacturer.

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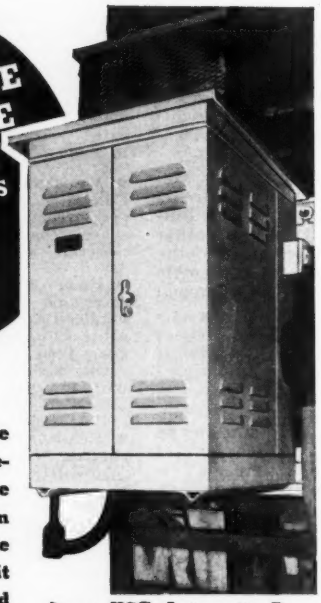

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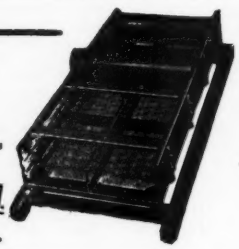

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INDEX TO ADVERTISERS

	Page
American Chain & Cable Co., Inc. American Cable Division	Third Cover
American Cyanamid Corp.	12-13
Deister Concentrator Co., The	65
Eimco Corp., The	8-9
Goodman Manufacturing Co.	6-7
Hoffman Bros. Drilling Co.	68
I-T-E Circuit Breaker Co.	68
Jeffrey Manufacturing Co.	2-14-15-Back Cover
Johnson-March Corp., The	62
Joy Manufacturing Co.	4-5
Knox Manufacturing Co.	Second Cover
Link-Belt Co.	16
Loftus, Peter F.	67
Mott Core Drilling Co.	68
Pennsylvania Drilling Co.	68
Roberts & Schaefer Co.	61
Robinson Ventilating Co.	68
Roebling's Sons Co., John A.	3
Sullivan Machinery Co.	11
Union Wire Rope Corp.	64
Universal Vibrating Screen Co.	68
Young, L. E.	67

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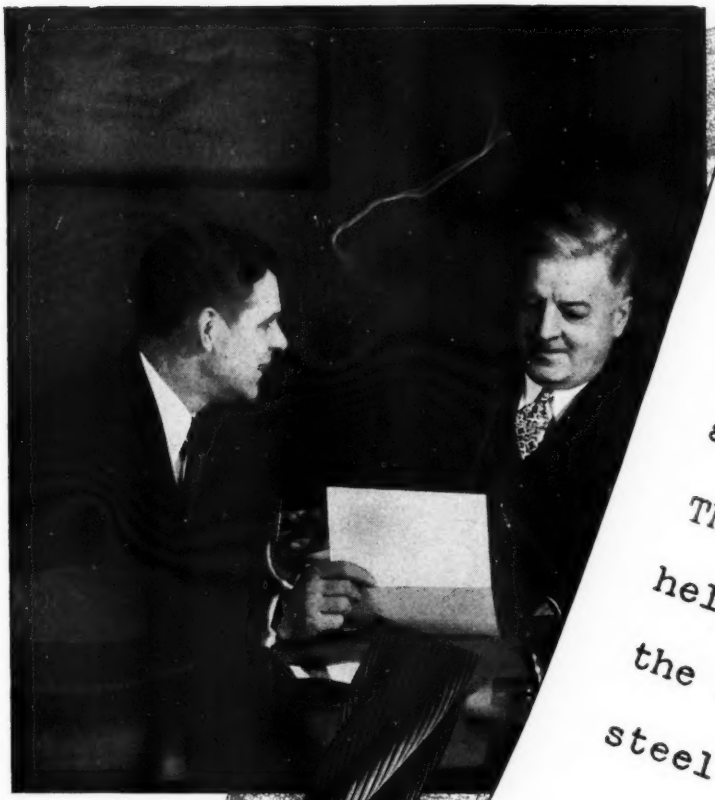

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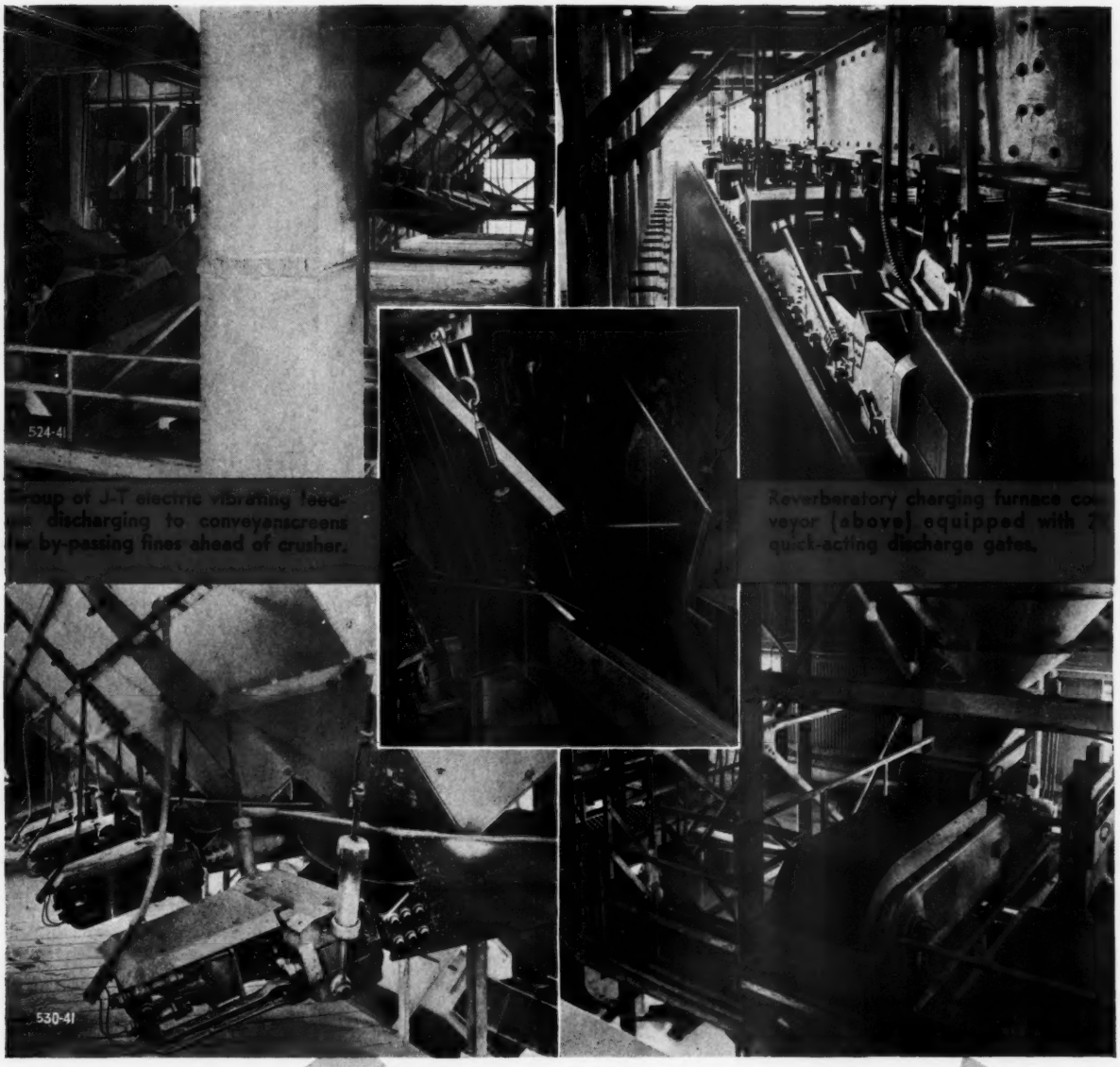

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